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Number 1

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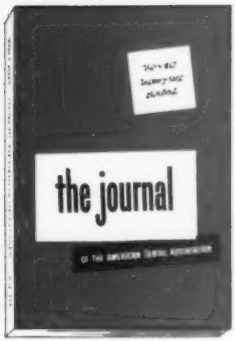
OF THE AMERICAN DENTAL ASSOCIATION



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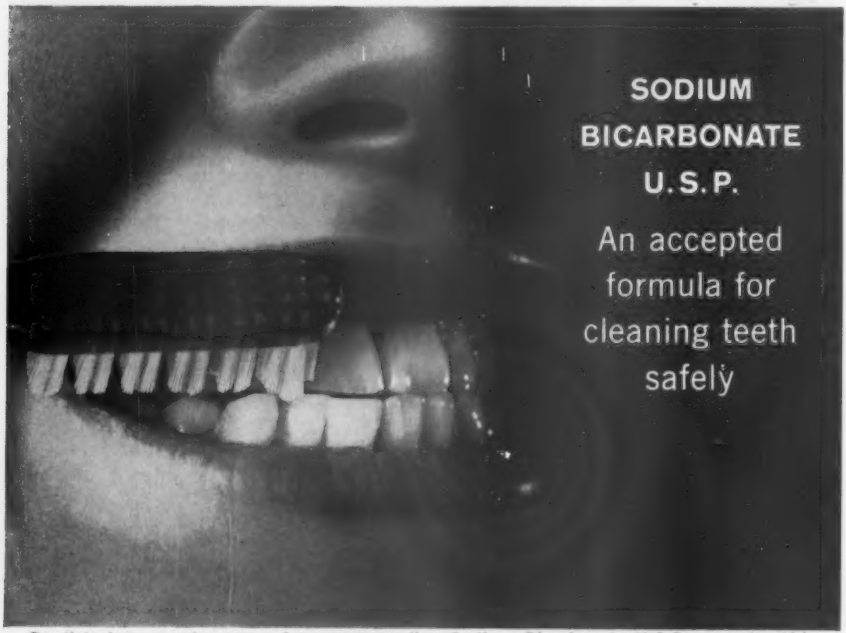

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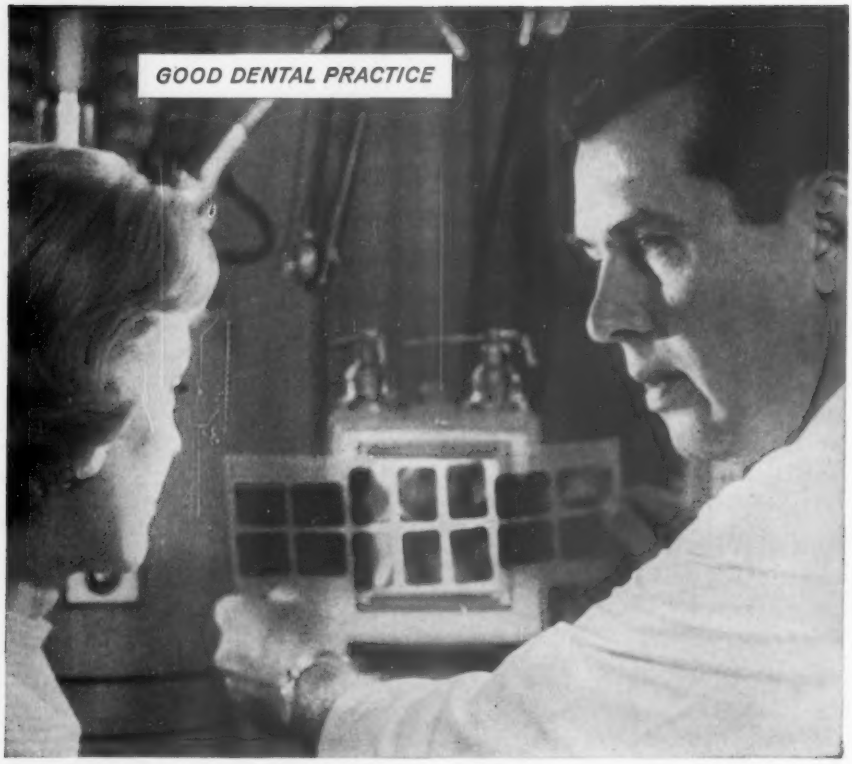

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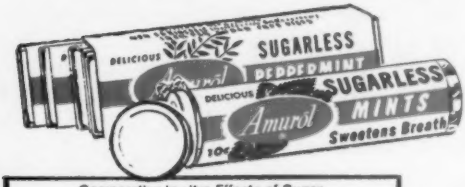

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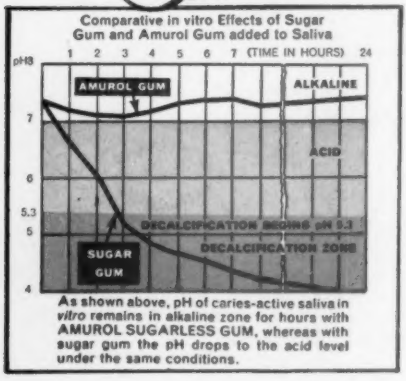
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1 2 3 4 5 6 7 (TIME IN HOURS) 24
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ALKALINE
7
ACID
6
5.3
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5
DECALCIFICATION ZONE
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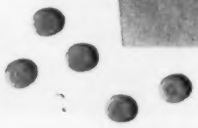

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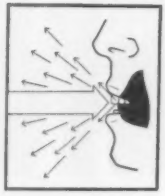

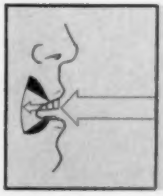

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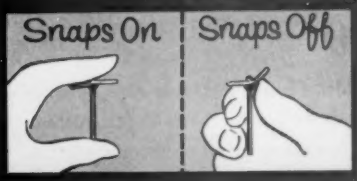

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1. Sleight, P.: The Lancet, p. 305 Feb. 6, 1960 and p. 932 (April 23) 1960.
2. Paul, W.D.: Dryer, R.L., and Routh, J.L.: J. Am. Pharm. Assn. (Scient. Ed.) 39:21 (Jan.) 1950.
3. Tebrock, H.E.: Ind. Med. & Surg. *20:* 480-482, 1951.

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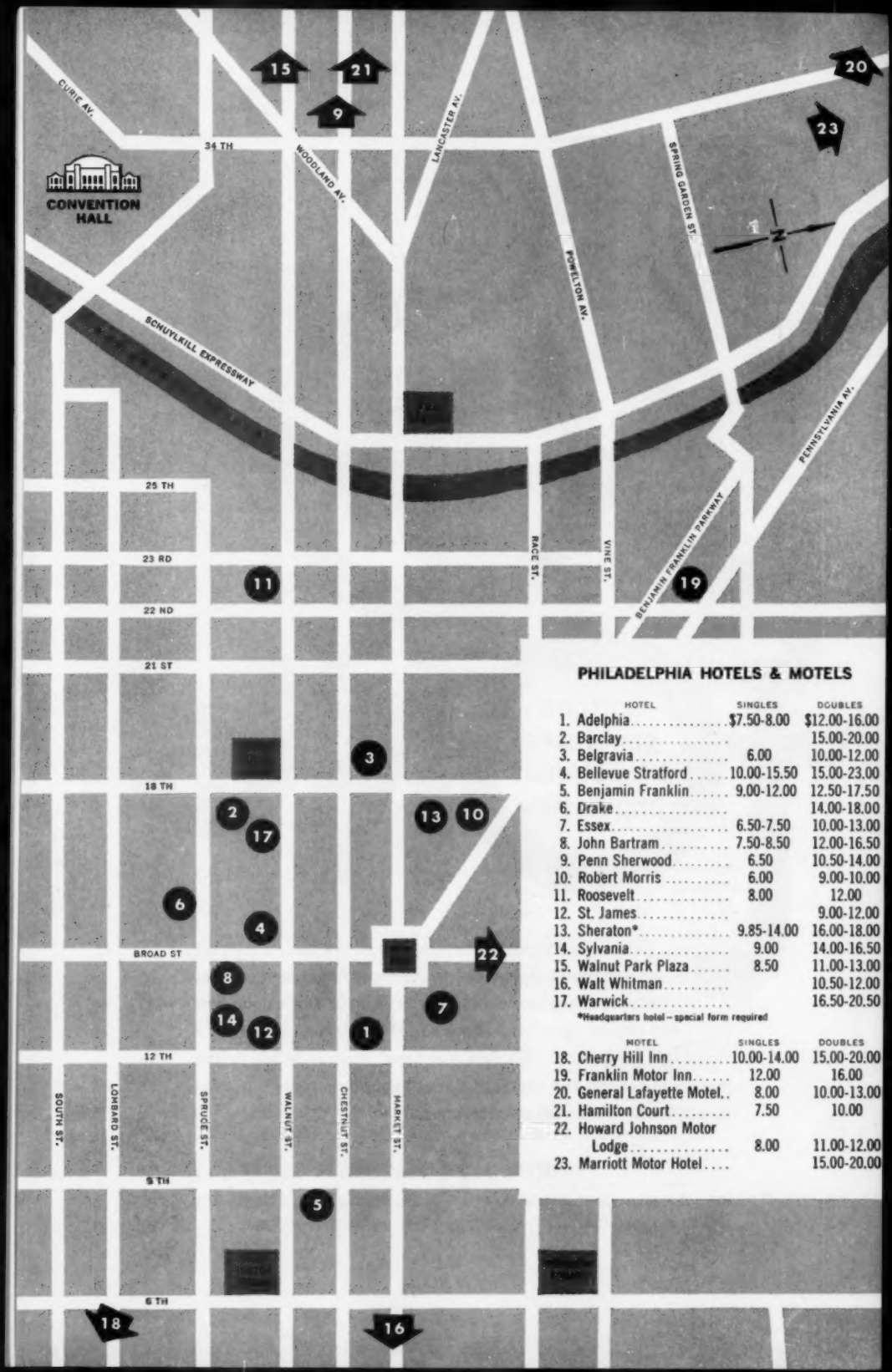

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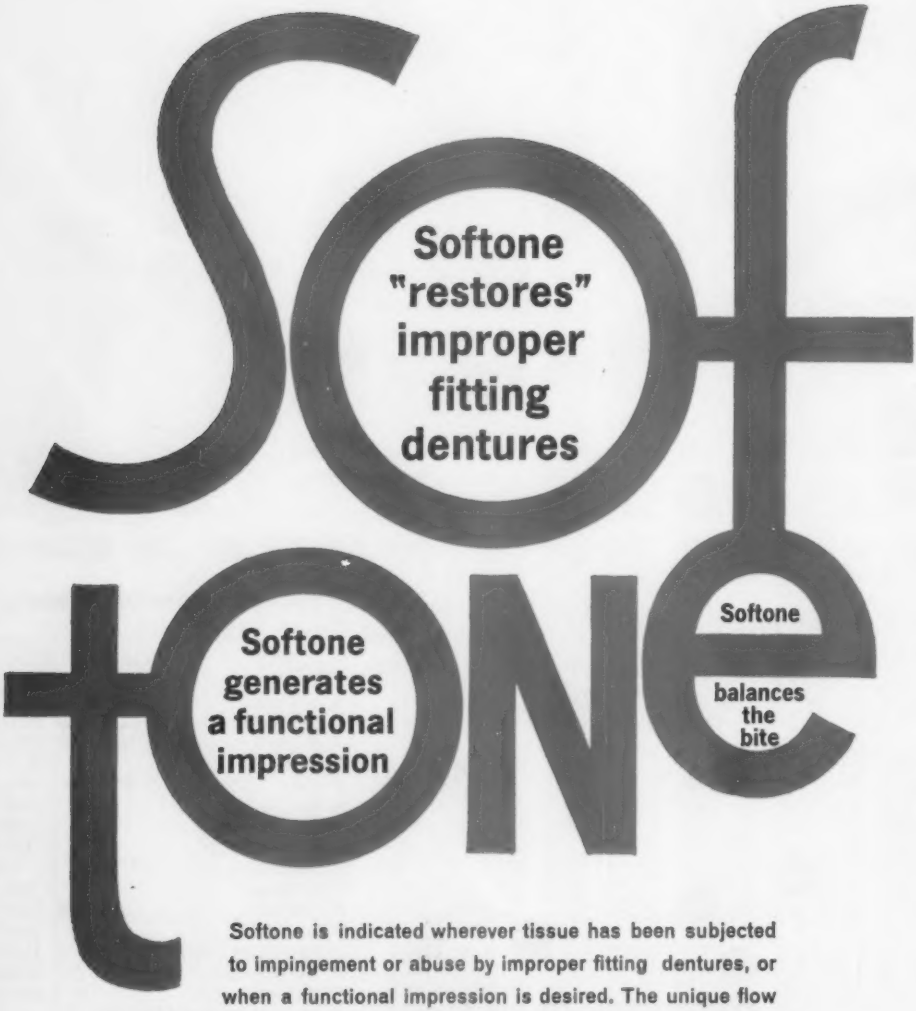

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To educate and to be educated

John E. Fogarty, Washington, D.C.*

H. G. Wells once declared that "human history becomes more and more a race between education and catastrophe." After reading the summary report issued by the Commission on the Survey of Dentistry, any thoughtful citizen will be made aware of how appropriately that statement may be applied to the future of dental health in this country. For one recurring theme in the Commission's summary is the crucial importance of education to the solution of the most serious problems now confronting members of the dental profession and the public they serve.

The Commission stresses again and again the extent to which sound solutions depend ultimately upon the nation's ability to educate and to be educated, upon our knowing more and applying what we know with greater force and effectiveness. This is the theme in the discussions of manpower planning, research expansion, better utilization of available preventive measures, specialized care for the aged, and the many other topics covered in their broad-based report.

If the problems detailed by the Commission had been totally unexpected, or if the burden of solving them had to be borne by any single group, we might well ask ourselves whether we have the time or the strength or the resources to assure a future of good dental health for the citizens of this country.

Fortunately, the task can be shared by many groups. Though the dental profession has both the right and the responsibility of leadership, the public—individually and through the medium of government—also has its duty to support you in finding solutions and in making them work.

The problems demanding attention are not totally new. All of us here today have long known that a critical need exists for more dentists and for the schools in which to train them, for better utilization

of auxiliary personnel, for intensified research, and for more effective health programs. Corrective action in all of these areas has been urged repeatedly by professional groups like the American Association of Dental Schools and the American Dental Association, by government agencies like the Public Health Service, by interested laymen and members of Congress like myself, and, most recently by the new President of the United States in his health message.

It does not detract from the importance of the Commission's report to suggest that its greatest value stems not so much from the newness of its basic findings as from the objectivity, candor, and practicality of its analyses and recommendations for action. What the Commission has given us is a fresher viewpoint, a broader perspective. To consider our own problems from another's vantage point is always helpful, for often we need to be reassured that deep concern and long familiarity with the issues at hand have not blinded us to obvious solutions. Otherwise, there is always a danger of responses becoming automatic rather than thoughtful. A commission like this one, representing a variety of interests, is not likely to fall victim to such occupational hazards as dedicated nearsightedness or overactive reflexes. And since, despite the diversity of their professional backgrounds, the members have been able to reach what Dr. Adams, in his foreword, describes as a firm agreement on what needs to be done, the authority and importance of their report is even further enhanced.

I therefore find it of great significance that the Commission's estimates of the seriousness of the dental manpower shortage not only substantiate what dental organizations and government agencies have said before, but indicate that the shortage may be even greater than anticipated. In the first place, these new estimates remove any basis for denying, as some people have, that there is any manpower problem to overcome. In the second place, they assure those of us who have been deeply concerned about inadequate dentist ratios that we were right to be concerned, and that the steps we have already taken to offset them have been well taken. We at least have gained a short head start in the race against time.

If American dentists had not scored impressive gains in their own efficiency, if they had not begun to employ auxiliary personnel more extensively and with greater effectiveness, the manpower shortage would already be felt by the public, and critically felt. Increased efficiency, therefore, has momentarily cushioned us against the impact of shortage. But what of the future? The margin for improved efficiency is narrowing. There is a limit to the load the individual practitioner can bear. These are facts which cannot be ignored, for neither the times we live in nor the standards we live by are fixed and static.

The Commission points out that currently only some 40 per cent of the public are receiving anything approaching adequate dental care. This is neither as good as the country needs nor the best it can expect. In the twentieth century, the entire conception of health and the health services has been changing. We look upon adequate health protection not as the special privilege of a fortunate few but as the right of all.

This modern viewpoint is reflected in the Commission's concern about the nation's manpower needs. Commission members see the future of dentistry as one of great growth and complexity, of increasing prestige and authority, and, by the same token, of greater responsibility. They see this responsibility as one which cannot be met by relying solely upon the achievement of higher technical proficiency in clinical procedures. The Commission would have us realize that this nation not only needs more schools and more dentists, it needs better schools

and better dentists. We can be glad that a start has been made in this direction.

As you of course know the President has recommended that over a ten year period the federal government make available funds in the amount of 750 million dollars for the construction and renovation of dental training facilities. Under that arrangement 60 million dollars a year would be provided by the federal government on a two for one matching basis for the construction of new facilities. Of this 15 million dollars is earmarked for new dental schools and 45 million for medical schools. An additional 15 million dollars available annually on a one for one matching basis would provide for the renovation of existing dental and medical teaching facilities.

The President also recommended a comprehensive program of federal scholarships. This program would provide each dental school with funds amounting to $1,500 per student per year multiplied by one fourth of the school's total enrollment.

The President's recommendations have already been introduced. There are other federal funds available for the building of more schools and training of more dentists. I have again introduced legislation which I think is an improvement on that of the President if I may say so. Under a matching arrangement similar to the one proposed by the President, the legislation I am proposing calls for a federal contribution of 100 million dollars a year for the construction of new dental and medical schools and 25 million dollars a year for improvement and expansion of existing facilities. These proposals, therefore, offer more federal aid than the President's. Yet, and I want to underscore this point, they also require more financial support at the state and community level. Instead of the 75 million dollars you must raise to benefit from the President's bill, you must raise 675 million dollars to benefit fully from mine. Furthermore, the Administration's bill designates a specific amount for the use of dental schools. My legislation makes no such designation.

As I see it, the need for dental schools is no less urgent than the need for medical schools, and in my proposal the only effective limit to dental participation will in a real sense be determined by the dental profession itself. How much of the available federal aid goes to dental schools will depend in large measure on how much public support you enlist in state and local levels.

Under the Kennedy proposal operating aid would be available to all schools participating in the program. This would be at the rate of $1,000 per scholarship student with the stipulation that the number of students used in computing the grant cannot exceed one fourth of the school's total enrollment. In the bills I have introduced, scholarships and aid are independent of each other. The scholarships would be made to states rather than to schools so that students from every section of the country would be given an equal opportunity for a dental career. My proposal sets a higher maximum on grants, $2,500 compared to $2,000. Operating aid is covered in a separate bill providing payment of $100,000 annually to each school plus an additional $500 for each student enrolled. Because this bill also awards each school another $500 for every student added to the average number previously enrolled, it will permit a college to expand and at the same time improve the quality of instruction. It will not only bring us closer to the common goal of adequate supply of dentists but also attain the highest standard of dental education which we all desire. But these bills have only been introduced and they are not supported by every segment of medicine in our country. If we want action we need your help in contacting your members in Congress.

The Commission on the Survey of Dentistry has a great deal to say about the method and content of undergradu-

ate dental training, and some of it is critical of things as they exist. I will not attempt to judge the worth of all the recommendations in the report. But many of the comments the Commission makes are as applicable to other branches of education as they are to dentistry, and in this regard, I found in them a vigorous and stimulating challenge to habitual patterns of thought.

I suggest to you that we in this country must become more constructively critical of our traditional approaches to education. We should ask some questions. Why do we teach what we teach? What is it we are educating for? And wherever we find that we are doing things just because they have always been done, we might ask whether we are educating for the twentieth and twenty-first centuries or merely perpetuating the methods inherited from the nineteenth. Education, after all, is not a monument to the past; it is the architecture of the future.

If I read the report aright, the Commission believes that in current dental education there is perhaps too much emphasis upon restorative dentistry, too little upon preventive. The Commission assumes—and I certainly agree—that the dentist's responsibility extends far beyond the providing of treatment to the patient who knocks on his door and demands it. If this were all we expected from our dentists, restorative dentistry might be all they needed to know. But the dental profession also has a responsibility for seeing that the receipt of care more accurately reflects the actual need for it. Treating the patient who knocks on the door is only one in a progression of important activities in which the profession participates. Ideally, the first step in that progression is the development of methods for the prevention of disease itself. Therefore, if dentistry is indeed educating for the future, it should obviously be educating for research.

As the Commission observes, "Of all avenues leading toward the prevention of dental disease, the one offering the most hope is research. One investigator, if he should discover a means of preventing or reducing periodontal disease, might do more for oral health than several thousand practitioners of restorative dentistry." Yet the Commission finds little reason for satisfaction with the current status of dental research, although it acknowledges the substantial progress which has been made in recent years.

The federal government has played, and undoubtedly will continue to play, a major role in conducting and sponsoring dental research programs. I have always been deeply interested in this field, and I look upon the growth of the National Institute of Dental Research—incidentally, N.I.D.R. will soon move into its new building—and of its grants program in support of extramural activity as being among the notable contributions the government has made to the advancement of health standards. I am glad to have had a part in making them possible. Yet I agree with the Commission that while the federal government should increase its support of research, and I think it will, the government cannot carry the burden alone. Financial support from other sources must be forthcoming.

There is, as you know, a codicil to the Commission's recommendations for increased financial aid: the increase should be commensurate with the increase in available research personnel. Since, as the Commission points out, the best source of researchers is the undergraduate student body, the availability of personnel depends to a very great extent upon the dental educator. Yet today, teachers do not have time to pursue research projects; students are given neither the scientific depth, nor the curriculum time, nor the intellectual stimulus to interest them in the field. The Commission sees the result as a shortage so acute that "the recruitment for dental research is even more important than the recruitment for dental practice," and it urges

the integration of research with teaching at the undergraduate level as a logical first step toward overcoming the shortage.

That stronger and better designed undergraduate programs will in time do much to strengthen the whole intricate structure of dental research in this country strikes me as a sound and practical observation. I therefore suggest that proposals which advocate federal or private financial aid for talented undergraduate dental students who are interested in research and teaching careers deserve serious consideration from us all. At the same time, ways must be found to increase the scope and intensity and effectiveness of activity at the more advanced levels of dental research.

For the general public, these extended programs of research will have greatest meaning when preventive discoveries are given practical application in day-to-day life. And in view of the seriousness of the over-all dental health problem, the nation's failure to utilize fully the preventive technics already at its disposal is nothing short of tragic.

Every leading health organization in the country, among them the American Dental Association, the American Medical Association and the American Association of Dental Schools, has endorsed fluoridation. The Commission on the Survey of Dentistry, therefore, speaks for informed opinion when it states it is "totally unimpressed by the arguments advanced, usually by health and other faddists, that fluoridation is dangerous, immoral, unconstitutional, and unscriptural." Yet today, more than ten years after the introduction of a simple procedure for the controlled fluoridation of public water supplies, something less than a fourth of the American people have access to the benefits that method provides. The public denies itself these benefits, and now the fluoridation of water supplies is not even pacing population growth. Evidently the "health and other faddists" have lately been more successful in presenting their case to the public than the profluoridationists, though the latter have scientific fact on their side. Perhaps the difference is in the intensity of effort.

Let me quote some other statements from the Commission's report and, I warn you, quote them out of sequence:

"Although 37 per cent (of some 750 dentists participating in an opinion survey) take part in fluoridation campaigns in their communities, only about 2 per cent have been active as individuals in initiating these campaigns."

"Widescale educational efforts must be undertaken to acquaint the American people with the importance of dental health and with means of attaining it."

"Education, in the dental health sense, has many facets ranging from campaigns on behalf of public health measures to hygiene instruction in primary school."

And, finally, there is the recommendation of the Commission that "all public agencies, with the assistance of voluntary associations and professional societies, make greater efforts to promote water fluoridation and community topical fluoride programs."

As the Commission recognizes, the possibility of making greater efforts will depend to a large degree upon the possibility of securing substantial grants for expansion of the state and local dental health programs needed to win widespread public support for fluoridation and other preventive measures. But important as they are, grants are not a substitute for incisive and coordinated action. They serve only as the foundation upon which better programs can be built.

I remarked earlier that the Commission continually stresses how much depends on our ability to educate and to be educated, and upon our ability to use what we know with greater force. The fluoridation issue is a case in point. If they are to strengthen and intensify activities in support of fluoridation, public health agencies at the national, state and

local level must make sure that they employ their special resources and knowledge and practical experience to the very fullest extent. And their efforts, in turn, must be reinforced by the professional knowledge and prestige and influence of the private practitioner, working individually in his community and through his dental society. This kind of cooperation should produce an educational force persuasive and authoritative enough to offset the statements, however dramatic, of the small but vocal opposition.

Valuable though preventive measures such as fluoridation are, I am sure the Commission is right when it states that the achievement of dental health solely through the prevention of disease is far in the future, a fact which throws into relief the importance of what the Commission calls "prevention of progression through treatment." And since people differ both in their ability to pay for care and even in their physical ability to seek it, the receipt of treatment cannot be left to chance. The Commission makes a series of recommendations for reducing distance between dentist and patient which impress me as both imaginative and workable.

One of these, the incremental care program for school age children, seems to me to be of particular value and importance. Beginning the first year with six year olds and adding a new crop of them each year, the program would eventually cover all children through high school, and do so at a minimum of cost, for the care would begin in most cases before serious treatment problems have had a chance to develop. Since cost to the family would be based on the ability to pay, every child, regardless of financial status, would have a chance for a lifetime of good dental health. And that, eventually, should mean an impressive reduction in the accumulation of the nation's unmet treatment needs. Therefore, though a program of this scope would undoubtedly require federal and state aid in the form both of financial support and of participation by official health agencies, it would also represent a national asset.

Another group whose special needs for treatment deserve more thoughtful attention is the chronically ill and aged. The Public Health Service, for a number of years, has been conducting a series of studies designed to measure existing needs among these people. In cooperation with state and local societies and health departments, the Service has been experimenting also in the development of technics and in the training of personnel to adapt traditional types of treatment to the special needs of people who are too infirm to visit the dentist in his office.

Some idea of the extent of the problem of caring for the homebound and institutionalized came out of a study recently completed in Kansas City. Four thousand nursing home patients, with an average age of 75, were examined; 88 per cent were in need of care. If this measure of need holds true for all the population aged 75, then there are today some four million older people who require a service they are not likely to get unless a concerted effort is made to provide it. In less than 20 years, the figure will be eight million. If we are to meet the special dental care needs of our growing population of older people, undergraduate training in dental geriatrics may well be a necessary addition to the modern dental school curriculum.

In efforts to narrow the gap between need and receipt of services, the greatest attention is perhaps being centered currently on the growth of various types of group prepaid dental care plans. Such plans may eventually have as great an impact on dental care as hospital and medical coverages have had upon medical care. The recommendations of the Commission that the dental profession cooperate with industry, labor and government in experimentation with various approaches to group programs are therefore eminently sensible. Their suggestion

that dental societies form service corporations to facilitate the development of group programs bears out the opinion of public health officers that this particular approach offers dentistry the best opportunity of assuring orderly growth and quality of care within the framework of group plans.

Even though many people disapprove in principle of group dental programs, cooperation in their design is still advisable. At least the dental profession must be prepared to face the changes they entail and to deal with them constructively. It is much better to control circumstances than to be controlled by them.

Controlling circumstances becomes increasingly difficult as society becomes more complex. It requires infinitely more knowledge and patience. Today the members of all professions find themselves involved in activities which a few years ago did not even exist. And as activities increase, so do the demands upon professional skills and qualities of leadership.

Because this is true, laymen and professional men must meet together to discuss problems of mutual concern. And it becomes all the more necessary for us to accept the fact that we cannot limit our vision to the merely convenient or tailor the future by a pattern fitted only to the past. That is why it is so essential to realize that we must train more professional people, and that we must train them better. Perhaps we must even train a new breed of men—men of broader vision and greater scientific depth than we have ever before known. Certainly in a field as essential as dentistry, we must, at the very least, forego the luxury of a narrow vocationalism in our educational processes.

To do what must be done will require the best that is in all of us—the willingness to try and the courage to fail. For much of what we must learn and teach can only be discovered by trial and error. If that is a painful process, it is also our greatest hope. As the great Oxford teacher E. R. Dodds once put it, "If the truth is beyond our grasp, the errors of tomorrow are still to be preferred to the errors of yesterday; for error in the sciences is only another name for the progressive approximation to truth."

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Theories • A theory may be wrong, but that does not matter; it is more important whether it is usable, whether it widens our scope and incites new experiments. ***Hessel de Vries, Physicist and Biophysicist. Science 131:1720 June 10, 1960.***

Clinical investigation on the relation of mercury to the amalgam restoration: I

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To investigate the relation between compressive strength and mercury content, 257 amalgam restorations were placed in standardized cavity preparations in vivo by three different technics which produced amalgam restorations of low, average and high mercury content. The restorations were examined periodically over a one year period. Some marginal deterioration was noted in restorations placed by all technics; both the number and severity of marginal failures increased as the residual mercury content increased. Surface roughness and general degradation were manifested by many of the restorations with average or high mercury content. The results re-emphasize the importance of maintaining accurate control of the residual mercury.

Over 60 years ago Black[1] stressed the clinical importance of the strength of amalgam and the variables influencing this property. Since then, compressive strength of amalgam, as well as the manipulative variables involved, have been thoroughly studied.[2-8] Even a cursory examination of that literature reveals that compressive strength has been one of the most common subjects for research.

In the original American Dental Association Specification No. 1, a 24 hour strength requirement of 35,000 pounds per square inch was established as the minimum limit. That requirement was deleted in the revision of this specification because it was found that all alloys passing the flow test invariably satisfied the compressive strength requirement.[9]

Obviously, strength sufficient to resist biting force is basic to the success of any dental restorative material.[1,3,10,11] The acceptable strength and flow values for amalgam have been established somewhat arbitrarily. The minimum strength that is necessary clinically is not known, and there are no data to indicate whether the previously established requirement is low, adequate or perhaps even high. A clinical survey of amalgam failures did show, however, that approximately 26 per cent of all failures could be attributed to fracture of one or more areas of the restoration.[12] The relatively slow rate at which the strength properties of amalgam increase is considered an important factor in the clinical behavior of the restoration and has been the subject of much speculation. Amalgam may exhibit

a 24 hour strength as high as 50,000 psi, yet the one-hour strength may be as low as 8,000 pounds psi.[3] In view of the low early strength of the material, it is generally thought that a majority of the fractures may occur very soon after insertion of the restoration.[13-15] On the basis of this theory, it has been common practice to warn the patient from biting on a Class II amalgam restoration for some time after its insertion. Complete agreement does not exist, however, in regard to the extent of this waiting period, and the suggested times range from one[2] or two hours[16] up to eight[3] or ten hours.[17] No accurate clinical data pertaining to the incidence of early fracture can be found.

Reference is often made to "edge strength,"[18] a rather nebulous property relating to the ability of a restorative material to resist mastication forces in the area of the restored cusp. Probably compressive strength best measures this property, although other physical properties such as tensile strength, shear strength, and ductility are also involved.

The relationship of the mercury content of the restoration to its physical properties, and especially compressive strength, has been studied by numerous investigators.[1, 8, 13, 19-21] Although at mercury levels between 45 and 55 per cent the strength appears to remain rather constant,[20] above 55 per cent a sharp loss in strength occurs. However, there is also ample evidence[4, 5, 21] that even very light condensation pressures are sufficient to reduce the residual mercury content below this suggested allowable level of 55 per cent and that residual mercury levels of approximately 52 per cent may be adequate clinically.[21] Thus it might be assumed that the final residual mercury content does not pose a clinical problem in the average amalgam restoration. Nevertheless, mercury analysis of clinical restorations[21, 22] has revealed that residual mercury contents of 60 per cent, or even higher, are not an unusual occurrence. Furthermore, similar tests have shown great variations in the residual mercury content between different areas of the same restoration, with the mercury usually in higher concentrations at the marginal areas.[20, 23, 24] Whether increased mercury in these areas, or in the bulk of the restoration itself, is responsible for clinical failure has yet to be proved.

Discoloration is another one of the undesirable characteristics of the amalgam restoration, and corrosion and tarnish have often been associated with the residual mercury content.[13, 16, 25-28] Although a relation between mercury content and discoloration has been widely accepted, the theory has no scientific corroboration; a recent in vitro investigation[29] has indicated that mercury content may not be directly related to corrosion.

A second, but in no way lesser, variable associated with strength and resistance to distortion or fracture is cavity design. Lack of bulk, isthmus width and depth and retention grooves have all been suggested as causes for failure.[12, 30, 31] The influence of cavity design on the clinical fracture of the restoration will be reported in a future publication.

From this brief review of the literature it is apparent that in general two factors are held responsible for fracture of the amalgam restoration. One is cavity design, whereas the second is inadequate compressive strength which has usually been associated with high mercury content. It is with the second factor that this research is concerned. The investigation was designed to establish the exact relation of mercury to the behavior of the restoration and to determine the clinical significance of the compressive strength test.

PROCEDURE

Physical Tests • It was first necessary to develop and standardize technics that would consistently produce amalgam res-

Table 1 • Physical properties of amalgam specimens prepared by the three technics

Technic	Physical properties				
	Compressive strength		Residual mercury (%)	Flow (%)	Dimensional change (microns/cm.)
	24 hr. (psi)	1 hr. (psi)			
A	49,000 ± 2,000	14,000 ± 2,000	48 ± 1	3	+ 4
B	30,000 ± 3,000	—*	58 ± 2	—*	+ 8.5
C	13,000 ± 1,000	—*	62 ± 1	—*	+15.5

*Test not possible because of weakness of specimen.

torations with specific but widely different residual mercury contents and hence with three different sets of physical properties. The three arbitrarily selected technics were: (1) technic A, which was to satisfy what are generally considered the requirements for the superior amalgam restoration; namely, low mercury content with a resultant high compressive strength; (2) technic B, designed for restorations of medium mercury content and "average" strength, and (3) technic C, which produced restorations with a high mercury content and a very low ultimate compressive strength.

Caulk Micro-Cut alloy pellets were used throughout the investigation. A Crandall balance was used to proportion the alloy and mercury, and amalgamation was done by a Crescent Wig-L-Bug. Condensation was carried out by Black no. 1, 2 and 3 serrated condensers.

During the development and standardization of the three technics, a series of possible combinations of variables was studied in order to acquire the mercury and strength values desired. Over 1,000 specimens were prepared and tested in the preliminary portion of the study. It was found that the desired physical properties could be obtained, and standardized, by varying the amount of mercury in the original mix coupled with modification of condensation pressure.

A 5:7 alloy-mercury ratio was employed for technic A and condensation done by the conventional "increasing dryness" method. With technics B and C, where higher final mercury was desired, the condensation pressure could not be controlled precisely enough to maintain the mercury content of the individual restorations within an acceptable range. In order to minimize the influence of this variable, the desired quantity of mercury was added prior to trituration, no mercury was expressed from the mix and only minimal condensation pressures were employed. However, the pressure was adequate to produce dense specimens, and during the laboratory tests, all specimens were carefully examined for voids or other discrepancies. Visual observation revealed no difference in the appearance of specimens prepared by the three technics either before or after the compressive strength test.

Flow and dimensional change were measured in accordance with American Dental Association Specification No. 1. Compressive strength specimens were loaded at the rate of 10,000 psi per minute. Residual mercury was determined by the method of Crawford and Larson,[32] which employs volatilization of the mercury in a nitrogen gas atmosphere. The results of these physical property tests for the three technics are shown in Table 1. Each value is the mean obtained on a minimum of 24 specimens. No flow values are listed for either technic B or technic C. Specimens prepared with these two technics fractured during the test, hence flow could not be meas-

Table 2 • Twenty-four-hour compressive strength values and residual mercury contents of a group of individual specimens

Technic A		Technic B		Technic C	
Strength (psi)	Res. Hg (%)	Strength (psi)	Res. Hg (%)	Strength (psi)	Res. Hg (%)
49,000	47.3	29,000	58.9	13,900	62.2
48,100	48.1	32,000	59.0	13,500	62.7
49,200	47.5	31,200	58.9	12,800	61.8
48,300	48.0	27,700	58.2	13,200	61.9
49,800	49.0	29,000	59.0	12,900	61.6
49,200	48.4	30,400	58.0	13,800	61.8
Average					
48,900	48.1	30,000	58.7	13,400	62.1

ured. Representative strength and residual mercury contents for six individual specimens prepared by each technic are shown in Table 2.

Cavity Preparation • A modified Black Class II cavity preparation for molars and for bicuspids was designed and its preparation standardized. In perfecting the cavity preparation dimensions, over 200 cavities were prepared on extracted teeth of varying sizes and from patients between 14 and 60 years of age. Since the primary purpose of this investigation was to investigate the role of residual mercury and the resultant physical properties in the clinical behavior of amalgam, a cavity preparation was employed that would provide the best possible conditions for the success of the restoration in terms of resistance to deformation or fracture under biting stress. The cavity preparations designed for the upper first molar and the first bicuspid were reproduced in plaster teeth seven times the average dimensions of natural teeth. The plaster teeth are shown in Figure 1, reduced in size for reproduction. Comparable preparations were used in the other teeth.

An isthmus width of 2.6 mm. was selected for molars and 1.7 mm. for bicuspids. This dimension was kept constant by passing a cylinder-shaped diamond point of this dimension through the area. The occlusal depth was established at 1 mm. below the dentinoenamel junction at the deepest point of the occlusal anatomy. The depth of this initial cut was measured with a calibrated Williams Perio-Pocket Probe.

Occlusal retention was obtained by producing small undercuts into the occluso-axial dentinal walls at the end of the grooves with the use of a no. 34 inverted cone bur. Care was taken not to undermine the occlusal enamel.

A sloping pulpal floor, rounded at the isthmus area, was produced by cutting a groove to increase the depth at the isthmus by approximately 0.6 mm. The

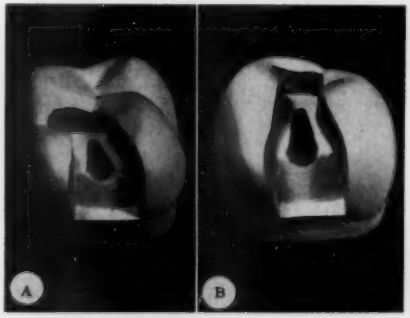

Fig. 1 • Plaster models illustrating cavity preparations designed for, A: Upper first molar. B: Upper first bicuspid

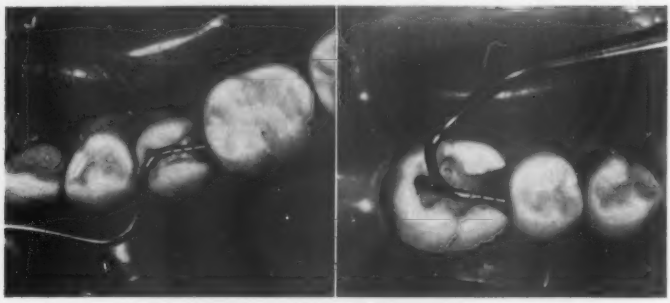

Fig. 2 • Measuring probe adapted for establishing axioproximal dimension. Left: In distal cavity preparation. Right: In mesioocclusal cavity

axiopulpal wall at the proximal box was slanted to increase the axiopulpal line angle, and the highest contour of the proximal surface of the adjacent tooth was standardized at 2 mm. for molars and 1.5 mm. for bicuspids. This dimension was again controlled by use of a calibrated Williams Perio-Pocket Probe, bent to a suitable angle. Figure 2 shows this instrument and its application. A similar instrument, with the working point bent at a right angle, was used to measure the depth at the occlusal box. Because of anatomical differences between teeth, this procedure produced a slanting wall of varying degrees but the resulting bulk at the occlusal two-thirds was uniform. The axiopulpal-line angle was rounded and proximal retention grooves were produced with a no. 700 tapered fissure bur.

Four dentists, not acquainted with the research plan, examined typical preparations and invariably agreed that the dimensions were considerably larger than the conventional Class II cavities. This was true even before grooving of the pulpal floor was accomplished. Thus it was evident that the conventional ideas for minimum bulk requirements had been exceeded.

Ten restorations for each of the three condensing technics were inserted and finished in cavities prepared in Dentoform teeth. They were then removed and analyzed for mercury. The uniformity of these results, illustrated in Table 3, indicated that these technics which had been perfected in laboratory molds could be duplicated in the clinical restoration.

Table 3 • Mercury content of test restorations placed in Dentoform teeth by each of the three technics

Technic A (%)	Technic B (%)	Technic C (%)
46.8	58.9	61.5
47.2	57.6	61.9
48.1	56.9	61.6
47.8	58.6	61.5
48.1	57.8	61.6
49.0	57.7	62.4
47.3	57.5	62.4
47.8	58.7	61.5
48.3	57.6	61.8
47.9	58.0	62.1
	Average	
47.7	57.9	61.8

Clinical Procedure • Great care was taken to select the clinical cases and the possible environmental conditions which could directly influence the behavior of the proposed restorations.

The teeth selected for use were the upper first and second bicuspids and first and second molars and the lower second bicuspid and first and second molars. Occasionally, a larger lower first bicuspid

was used. All restorations were inserted under a rubber dam.

Three test cavities for molars and three for bicuspids were prepared in the mouth. A rubber base impression was taken for each cavity, a stone cast poured and the measurements of the cavity preparation checked for accuracy on the cast. Three restorations were then condensed and finished in these test cavities, after which they were removed and analyzed for mercury. The mercury values compared favorably with the data obtained in restorations placed in the Dentoform teeth (Table 4).

In as many patients as possible an effort was made to place restorations by all three technics in the same mouth. In mouths in which only one suitable interproximal lesion was present, it was always restored with technic C. Observations on these restorations were included in the composite data. A restoration placed by technic A was then inserted in any other, and thus unstandardized, cavity in that particular mouth and charted as A-1. However, these restorations were taken into consideration only for the tabulation of data on the incidence of tarnish and corrosion.

Whenever a restoration was to be condensed on a tooth adjacent or near a previously placed restoration, in order to avoid mercury contamination, the older restoration was coated with petroleum jelly before condensation of the new restoration.

All restorations were carefully polished 24 hours after insertion. A meticulous polishing technic was followed with special care being taken to avoid generation of heat.

Bitewing roentgenograms were taken periodically in order to detect any possible cervical discrepancy. Figure 3 shows a typical view of two restorations placed on a lower second molar and second bicuspid. The increasing bulk produced at the isthmus area by the slanting of the pulpal floor is evident.

Table 4 • Mercury content of clinical restorations placed by each of the three technics

Technic A (%)	Technic B (%)	Technic C (%)
50.5	56.8	61.6
48.8	59.0	62.3
48.6	57.7	62.1

The total number of restorations placed for each technic was as follows: technic A, 61; technic A-1, 52; technic B, 69, and technic C, 75. These restorations were placed in a total of 53 patients whose ages ranged between 14 and 52 years. They were examined for evidence of (1) dimensional change; (2) marginal deterioration; (3) gross fracture; (4) surface roughness, and (5) tarnish and corrosion. In order to detect early failure, the first examination was made at 24 hours, just prior to polishing of the restoration. This initial check was followed by observations at three-month intervals. A card was made for each individual restoration; at the time of the examination appropriate notes were made on this card. Photographs were taken where it was deemed desirable to record the existing condition at that time.

Naturally such evaluations are somewhat subjective and more qualitative than quantitative. However, in order to reduce to a minimum the human error, each restoration was examined not only

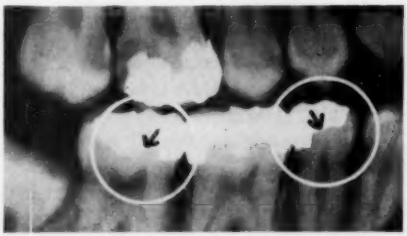

Fig. 3 • Encircled areas indicate test restorations. Arrows indicate sloping pulpal wall produced by grooving

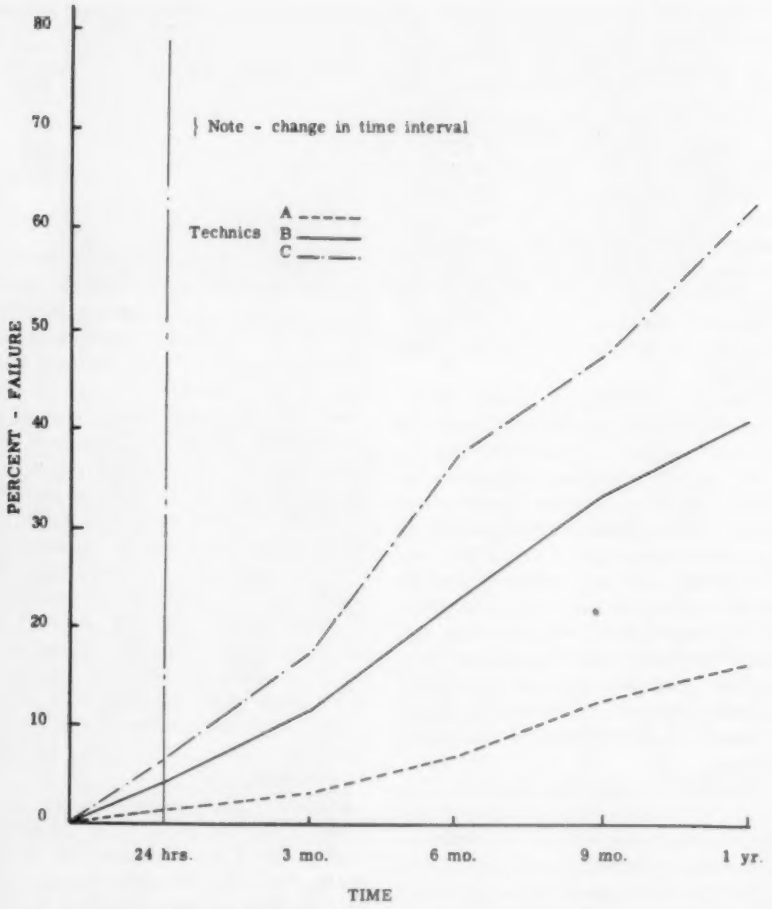

Fig. 4 • Incidence of marginal failure at end of one year among restorations

by the investigators but also by at least two dentists not associated with the study. The results shown are representative of the group opinion.

After approximately 30 restorations had been placed by each technic and no evidence of bulk (isthmus) fracture had been found, patients were no longer warned against biting on the new restoration. They were simply instructed to eat as desired. At this same time, an effort was purposely made to leave the restorations in slightly high occlusion at the occlusal surface adjacent to the proximal portion of the restoration, mainly at the marginal ridge. By such procedures the restorations were subjected to a more severe test and were exposed to abnormal stress during the critical first hours after insertion.

Throughout the investigation random restorations were removed after insertion

and analyzed for mercury in order to assure that the desired mercury levels were routinely being maintained in these clinical restorations.

RESULTS

The data reported here are the result of observations made over a one year period. A great many of the restorations charted as failures in this study did not exhibit such severe deterioration that they would be considered clinical failures in a less strict oral examination.

Dimensional Change and Flow • No evidence of either expansion or contraction was found in any of the restorations placed by the three technics. Likewise no evidence of failure arising from flow could be detected.

Marginal Failure • The percentage of marginal failures for all three technics occurring over a one year period is graphically illustrated in Figure 4. The marginal deterioration occurred earlier and more frequently with technic C than with the other two technics. The severity of this degradation was greater with technic C than with either technics A or B, and both the severity and the incidence increased as the restorations aged. Likewise restorations inserted by technic B, the method producing the medium mercury content, exhibited a larger number and a more pronounced type of marginal failure than did those restorations placed by technic A.

Although the occurrence of this type of failure among technic A restorations was greater than might have been anticipated, it should again be emphasized that the discrepancies tabulated as failures could be described only as slight and the replacement of the restoration was never warranted. Even with technic C, where this type of failure was most severe, the condition was never detected by the patients, and immediate replacement of the restorations was not indicated. A technic C restoration, three months after placement, is shown in Figure 5, A. At the six month examination a small line of fracture was detected along the margin (Fig. 5, B). This same restoration is shown several months later in Figure 5, C; the fractured portion has now broken out. This particular restoration is an example of one of the more severe instances of marginal breakdown observed during the course of the investigation.

Surface Texture and Surface Roughness • The surface texture of restorations placed by technics A and B, both before and after polishing, appeared identical to the unaided eye. The appearance of specimens placed by technic C was similar although the polished surface seemed to be less bright. In Figure 6, left, representative restorations placed by the three technics are shown immediately after polishing. Approximately two weeks later it was observed that all the restorations had lost some of their original luster. No evidence of stain was present, but the dulling might be interpreted as a mild degree of tarnish. Restorations placed by all three technics began to assume the same appearance by 20 days (Fig. 6, right). However, as the restorations aged, differences in the surfaces of the various restorations placed by the three condensation procedures became increasingly apparent. Although there was no change observed in the surface texture of any restorations placed by technic A, many restorations placed by technics B and C began to exhibit roughening of the surface. By the end of one year over 60 per cent of all restorations placed by the high mercury procedure (technic C) and over 30 per cent of those placed with medium mercury method (technic B) gave evidence of surface roughness (Fig. 7).

Not only were there differences in the number of B and C restorations affected, but also between the rapidity of the de-

terioration and the degree of roughness obtained. Generally the signs of degradation appeared earlier with technic C and were more pronounced. For example during the one year observation period, no surface failure of a restoration placed with technic B progressed beyond a "mild" condition, whereas 14 of the 75 restorations placed by technic C exhibited surface roughness that became progressively worse with time. Six were classified as very severe and eight as moderate. In the severe cases, the condition advanced from an initial slight roughness, appearing about two months after insertion, through a general rapid deterioration of the surface. This very marked roughness, accompanied by the over-all marginal deterioration, gave the appearance of the restoration being "washed out." A series of photographs (Fig. 5, A, B, and C) illustrates the progress of this condition as it was observed on a lower first molar. The most severe case of surface deterioration and general degradation which was seen during the course of the study is shown in Figure 8.

Critical examination of these cases of surface roughness indicated that they were associated with occlusal wear since the proximal portions of the restoration always remained unaffected. Further evidence supporting this theory was noted on the tarnished restorations that developed severe roughness. The stained appearance disappeared on the occlusal but remained on the proximal areas. This new appearance, although very rough, resembled the metallic gray color of the freshly carved amalgam. This behavior would seem to imply that the stained surface was being removed as a result of abrasion which constantly exposed new layers of amalgam.

Tarnish and Corrosion • No clinical difference could be detected between the three technics in either the incidence or the intensity of tarnish. When discoloration did occur, all restorations in the same mouth tarnished to the same degree and in no restoration progressed beyond the moderate degree characterized by a light brown stain. It was noted that all instances of tarnish occurred between the second and sixth month after insertion. After six months no increase in the incidence or the intensity was apparent.

Gross Fracture • Despite the fact that over 70 per cent of all restorations were carved in relatively high occlusion, no early gross fracture was observed in restorations placed by any of the three technics. In some instances the effects of high occlusal relationship resulted in a "dishing out" or "saucering" of the material. The arrow "a" in Figure 8 demonstrates the effect of trauma on a technic C restoration, while arrow "b" shows the effect on a technic B restoration.

Out of the entire group of 257 restorations, only one case of isthmus fracture was observed. A technic C restoration fractured between the 9-month and 12-month intervals. No evidence of excessive trauma was detected on this particular restoration.

DISCUSSION

The findings on tarnish and corrosion support those of an earlier laboratory study[29] which indicated that discoloration of amalgam restorations was not a direct function of the mercury content. However, in view of the rough surface developed by the high mercury content restorations, it should be interesting to re-examine these restorations for stain and tarnish after a longer period in the oral cavity.

The observations on flow serve to reaffirm the previous clinical observations that excessive flow does not appear to be a factor in the failure of amalgam restorations.[12,33] The "saucering" effect observed on some of the restorations that were left in high occlusal relationship might be interpreted as a localized flow,

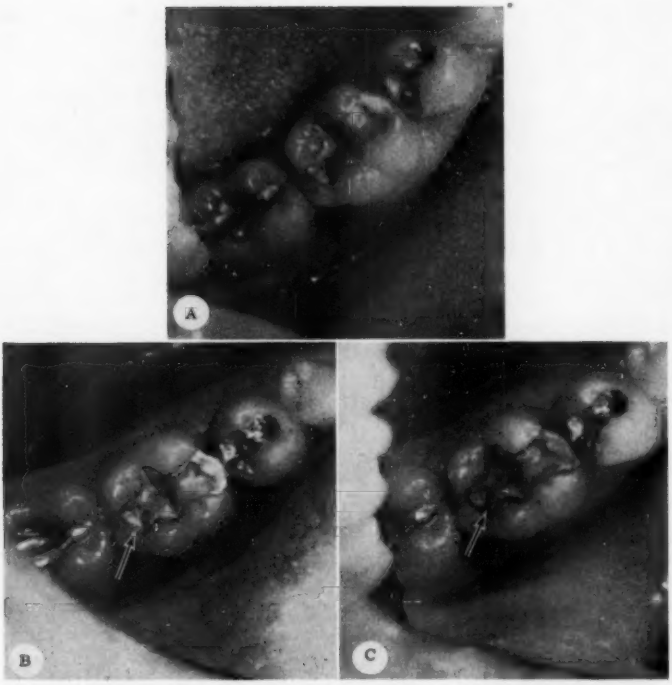

Fig. 5 • Progressive deterioration of technic C restoration in lower left first molar three months (view A), six months (view B) and nine months (view C) after insertion. Arrow in view B indicates line of marginal fracture and in view C, this section has been lost. Technic B restoration in lower left second bicuspid is also shown in each view

Fig. 6 • Left: Restorations immediately after polishing. Left: Restoration in upper right first molar placed by technic C; second bicuspid, technic A, and first bicuspid, technic B. Right: Restorations 20 days after insertion. All show some loss of luster. Restoration in lower left second molar, technic B; first molar, technic A, and first and second bicuspid, technic C

but it might also be speculated that this displacement of the amalgam might have safeguarded the restorations from fracture.

The results here suggest that a high resistance to compressive forces, at least with regard to prevention of gross isthmus fracture, may be a somewhat overrated property. However, it must again be emphasized that this is a short-term study and the behavior of these restorations with regard to fracture cannot be predicted over a prolonged period on the basis of these data. Furthermore, laboratory tests have shown that amalgam specimens will withstand only about 22 per cent of their ultimate compressive strength when subjected to a fatigue type of test.[34] A tensile strength test has also been suggested as a superior means of evaluating strength properties.[35]

It should also be borne in mind when considering these results that the cavity used here was specifically designed to provide the best possible conditions for the success of the restorative material. With a more conservatively designed cavity, compressive strength might assume a more critical role. This can be determined only through further research and it is hoped that the second phase of this investigation dealing with cavity preparation will aid in clarifying the significance of compressive strength. Nevertheless, considering the low ultimate compressive strength of amalgam restorations placed by technic C associated with the high occlusal relationship left on many restorations, the findings with regard to resistance to gross fracture are striking and strongly suggest that the concepts relative to the necessity of a high early compressive strength might need some revision.

Although the incidence of gross isthmus fracture was negligible, the deleterious effects of excessive mercury on the clinical amalgam restoration have been demonstrated. Regardless of the specific properties involved, either resistance to abrasion, tensile strength, compressive strength or combinations of these and other properties, the surface and marginal deterioration arising from the presence of excessive quantities of mercury in the finished restoration was vividly evidenced. The original design of the experiment did not lend itself to the determination of the exact maximum allowable level of mercury, but the data imply that the theoretical safety limit of 55 per cent, established on the basis of in vitro compressive strength tests,[20] may be clinically acceptable. Even though strength, itself, perhaps is not as critical a clinical factor as always believed, it may well provide a relatively reliable screening test for amalgam. The merit of the strength test may be that it indirectly provides a satisfactory index for evaluating marginal deterioration and corrosion. In other words, an amalgam that has a satisfactory compressive strength will probably give reasonably good service in the mouth. These results re-emphasize the importance of maintaining accurate control of the mercury-alloy ratio and suggest that further attempts toward development of standardized manipulative procedures, such as the minimal mercury technic,[36] are worthwhile. In spite of the fact that the mercury content in the finished restoration can be easily controlled, a series of small errors may easily lead to an amalgam restoration with a residual mercury content that exceeds the apparently critical figure of approximately 55 per cent.

This discussion is not meant to imply that a low mercury content will alleviate all problems with the amalgam restoration. Some chipping and fraying of the margins was observed even in restorations placed by the low mercury procedure, although the incidence and severity were much less than with other technics. This fact supports previous statements by Black[1] and Souder and Paffenbarger[9] to the effect that marginal weakness is an intrinsic inadequacy of this type of resto-

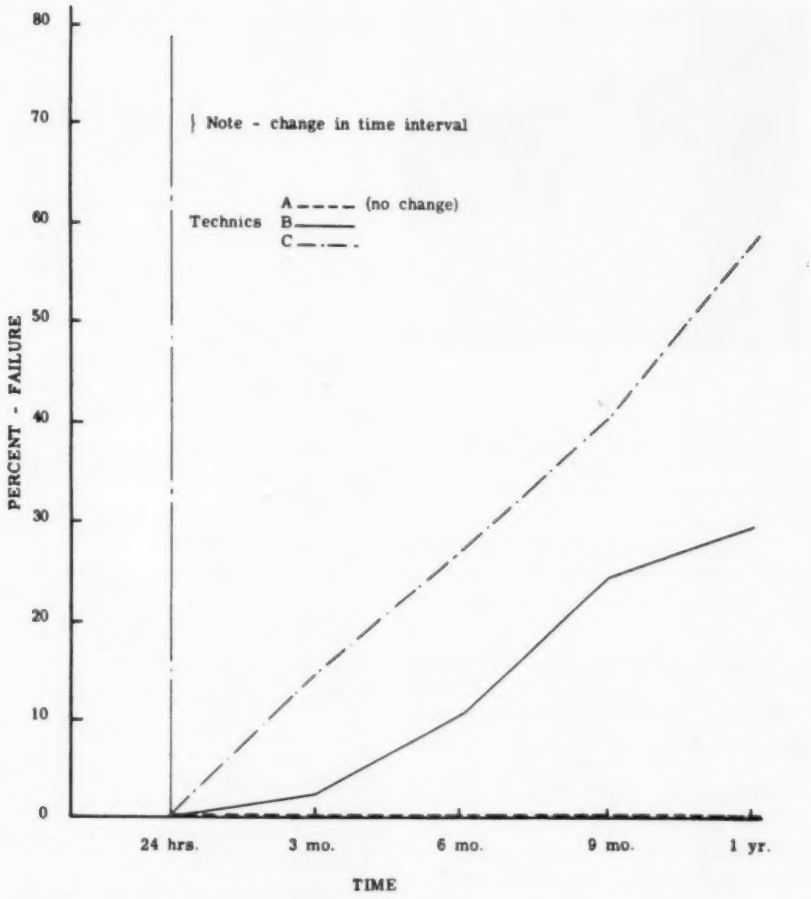

Fig. 7 • Incidence of surface roughness at end of one year among restorations

ration. The data collected in this study did not provide an explanation as to the mechanism of the marginal breakdown.

These results are preliminary, based on only one year's observation. The continued examination of these restorations and the use of a second cavity preparation of a more conservative design should contribute more to an understanding of the problem involved in clinical failure of the amalgam restoration.

SUMMARY

Two hundred and fifty-seven amalgam restorations were placed in standardized cavity preparations by three different technics which produced amalgam restorations of three widely different mercury contents and hence, widely different sets of physical properties. These restorations were examined 24 hours after insertion and at three-month intervals over a one-year period. Observations were:

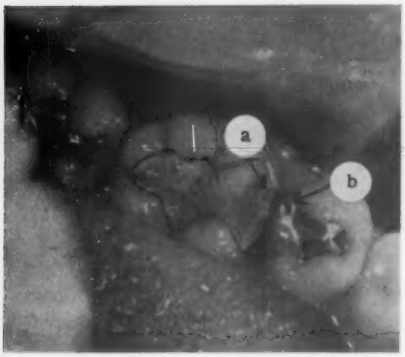

Fig. 8 • Restoration in lower left first molar (technic C) was most severe instance of general degradation observed. Note extreme roughening of surface and line of fracture. Effects of traumatic occlusion on this restoration and adjacent one (technic B) are evident

1. No failures due to flow or dimensional change were observed, even when the mercury content was approximately 62 per cent.

2. During the one-year period of observation only one case of isthmus fracture was observed even though many of the restorations were purposely left in high occlusal relationship and one third of them had a 24 hour compressive strength of only 13,000 psi.

3. Some marginal deterioration was noted in restorations placed by all technics; however, both the number and the severity of marginal failures increased as the residual mercury content of the restorations increased.

4. Surface roughness and general degradation were manifested by many of the restorations that contained 58 per cent mercury, and there was further increase in both the incidence and the degree of degradation in the groups of restorations containing 62 per cent mercury.

5. No correlation was observed between the amount of mercury in the final restoration and the degree or rate of tarnish and corrosion.

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1. Black, G. V. Investigation of the physical characters of the human teeth in relation to their diseases, and to practical dental operations, together with the physical characters of filling-materials. D. Cosmos 37:553 July; 637 Aug.; 737 Sept. 1895.

2. Taylor, N. O., and others. Effects of variable factors on crushing strengths of dental amalgams. J. D. Res. 28:228 June 1949.

3. Phillips, R. W. Compressive strength of amalgam as related to time. J. D. Res. 28:348 Aug. 1949.

4. Ward, M. L., and Scott, E. O. Effects of variations in manipulation on dimensional changes, crushing strength and flow of amalgams. J.A.D.A. 19:1683 Oct. 1932.

5. Ward, M. L., and Scott, E. O. Further studies on the effect of variations in manipulation on dimensional changes and flow of amalgams. J.A.D.A. 22:1164 July 1935.

6. Ward, M. L., and Scott, E. O. Influence of variations in manipulation upon volume change and strength of amalgam. (Abst.) J. D. Res. 11:481 June 1931; 12:561 June 1932.

7. Ware, A. L., and Docking, A. R. Effect of manipulative variables on dental amalgams. I. Objective method of testing. Austral. J. Den. 58:283 Oct. 1954.

8. Ryge, Gunnar, and others. Dental amalgam: the effect of mechanical condensation on some physical properties. J.A.D.A. 45:269 Sept. 1952.

9. Souder, W., and Paffenbarger, G. C. Physical properties of dental materials. National Bureau of Standards Circular C-433. Washington, D. C., U. S. Government Printing Office, 1942, p. 3-34.

10. Tingley, H. E. Clinical use of amalgam. D. Items Interest 62:608 July 1940.

11. Blackwell, R. E. G. V. Black's Operative dentistry, vol. 2, ed. 9. South Milwaukee, Wis., Medico-Dental Publishing Co., 1955, p. 223.

12. Healey, H. J., and Phillips, R. W. Clinical study of amalgam failures. J. D. Res. 28:439 Oct. 1949.

13. Phillips, R. W., and Boyd, D. A. Importance of the mercury-alloy ratio to the amalgam filling. J.A.D.A. 34:451 April 1, 1947.

14. Phillips, R. W. Amalgam—its properties and manipulation. New York J. Den. 23:105 March 1953.

15. Mosteller, J. H. Evaluation of the A.D.A. specification for amalgam alloy in relation to particle size. Ann. Den. 12:19 March 1953.

16. Kilpatrick, H. C. Elimination of variables in amalgam manipulation. D. Digest 49:76 Feb. 1943.

17. Gable, A. B., editor. American textbook of operative dentistry, ed. 9. Philadelphia, Lea & Febiger, 1954, p. 581.

18. Skinner, E. W., and Phillips, R. W. Science of dental materials, ed. 5. Philadelphia, W. B. Saunders Co., 1960, p. 23.

19. Gray, A. W. Metallographic phenomena observed in amalgams. J.A.D.A. 6:513 June; 909 Oct. 1919.

20. Swartz, M. L., and Phillips, R. W. Residual mercury content of amalgam restorations and its influence on compressive strength. J. D. Res. 35:458 June 1956.

21. Crawford, W. H., and Larson, J. H. Dental restorative materials: amalgam, acrylics. J. D. Res. 33:414 June 1954.

22. Phillips, R. W., and Swartz, M. L. Mercury analysis of one hundred amalgam restorations. J. D. Res. 28:569 Dec. 1949.

23. Strader, K. H. Amalgam alloy: its heat treatment, flow, mercury content and distribution of dimensional change. J.A.D.A. 38:602 May 1949.

24. Wilson, R. T.; Phillips, R. W., and Norman, R. D. Influence of certain condensation procedures upon the mercury content of amalgam restorations. J. D. Res. 36:458 June 1957.

25. Flag, J. F. Metallic pastes for filling teeth. Am. J. D. Sc. 4:210, 1844.

26. Sweeney, J. T. Amalgam manipulation: manual vs. mechanical aids. Part II. Comparison of clinical applications. J.A.D.A. 27:1940 Dec. 1940.

27. Swartz, M. L., and Phillips, R. W. Study of amalgam condensation procedures with emphasis on the residual mercury content of the increments. I. Strength, flow, and dimensional change. J. D. Res. 33:12 Feb. 1954.

28. Skinner, E. W., and Phillips, R. W. Science of dental materials, ed. 5. Philadelphia, W. B. Saunders Co., 1960, chapter 21.

29. Swartz, M. L.; Phillips, R. W., and El Tannir, M. D. Tarnish of certain dental alloys. J. D. Res. 37:837 Sept.-Oct. 1958.

30. Roper, L. H. Restorations with amalgam in the army: an evaluation and analysis. J.A.D.A. 34:443 April 1, 1947.

31. Moss, R. P. Amalgam failures. U. S. Armed Forces M. J. 4:735 May 1953.

32. Crawford, W. H., and Larson, J. H. Residual mercury determination process. J. D. Res. 34:313 June 1955.

33. Phillips, R. W., and others. Clinical observations on amalgam with known physical properties—final report. J.A.D.A. 32:324 March 1945.

34. Wilkinson, E. G., and Haack, D. C. Study of the fatigue characteristics of silver amalgam. J. D. Res. 37:136 Feb. 1958.

35. Mahler, D. B. Analysis of stresses in a dental amalgam restoration. J. D. Res. 37:516 June 1958.

36. Eames, W. B. Preparation and condensation of amalgam with a low mercury-alloy ratio. J.A.D.A. 58:78 April 1959.

Viral hepatitis in relation to dentistry

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Case reports provide good circumstantial evidence that some dentists may have transmitted viral hepatitis from patient to patient. The possibility of transmitting viral hepatitis should influence dentists to use every possible precaution to sterilize all cutting instruments that may be contaminated with blood before the instruments are reused. It is suggested that instruments capable of transferring blood from one patient to another be sterilized by autoclaving at 121°C. for 15 minutes or by exposure to dry heat at a temperature of 160°C. (320°F.) for one hour. Exposure to boiling water (100°C.) for 30 minutes should be considered minimum treatment for safety in disinfecting penetrating instruments.

The term "viral hepatitis" generally refers to diseases caused by two or possibly more filtrable infectious agents. These agents produce a systemic disease with a characteristic type of liver damage; however, jaundice is not a necessary condition for diagnosis.[1] The causative viruses are not yet identifiable by cultural or specific serological methods, thus available knowledge of the diseases and causative agents has been obtained from clinical observations, including experiments with human volunteers.

The exact relationship between the two agents causing viral hepatitis is not fully understood. However, recognized differences are sufficient to support the view that the agents produce somewhat similar pathologic conditions but differ in epidemiologic and immunologic characteristics. These viral agents are commonly referred to as "infectious hepatitis virus" and "serum hepatitis virus," but these names are not entirely satisfactory since both of the viruses may be transmitted by parenteral injections. In view of this the term "Virus A" and "Virus B" are often used for infectious hepatitis

virus and serum hepatitis virus respectively.[1,2]

In an excellent presentation on viral hepatitis, Eichenwald and Mosley[1] include the following concise differentiation between the two viral agencies:

> (1) Virus A: This agent is responsible for cases of the disease recognized chiefly on epidemiologic grounds as infectious or epidemic hepatitis. This form of the disease has an incubation period of from 10 to 50 days, with an average of about 30 days. The virus is known to be present in the feces and blood during the acute stage and in the blood during the incubation period. The feces and blood are infectious when administered by oral and parenteral routes.
>
> (2) Virus B: This agent accounts for the illness formerly called homologous serus hepatitis, transfusion jaundice, postvaccinal jaundice, postinoculation jaundice, and delayed arseno-therapy jaundice. This disease has an incubation period of 60 to 160 days. The virus has been demonstrated to be present in the blood, but not the pharyngeal secretions, urine or feces. Blood or blood fractions are infectious to others only when administered parenterally.

POSSIBLE ROLE OF DENTIST IN TRANSMISSION

Since this presentation is chiefly concerned with a consideration of the possible role of the dentist in transmission of viral hepatitis, only the following phases will be considered: (1) mode of transmission; (2) amount needed for infection; (3) resistance of the virus to physical and chemical disinfecting agents, and (4) evidence for transmission by dental procedures.

Mode of Transmission • Virus A (infectious hepatitis virus) appears in feces during the preicteric phase of illness and persists for 1 to 2 weeks after onset of jaundice in typical cases in adults.[1] There is evidence of a fecal to oral route including contamination of water, food and milk.[1] There is also the possibility that insects may play a role in the mechanical transmission in the fecal to oral route. Virus A may occur in the blood as early as two weeks prior to the onset of jaundice, and blood or blood products obtained during these periods are infective for others if introduced parenterally.[1]

The only proved means of transmitting Virus B (serum hepatitis virus) is by parenteral introduction.[3] Patients with Virus B infections have a viremia which may begin as early as three months prior to onset of symptoms and persist into the acute phase of the disease.[1] Furthermore, either virus may occur in the blood of individuals who have no history of hepatitis or any symptoms suggestive of acute or chronic illness. This carrier state may persist for at least 1 to 5 years, and the carrier rates for Virus B have been estimated at 0.5 per cent of all individuals.[1]

Amount Needed for Infection • It has been shown that as little as 0.01 ml. of blood from a patient with infectious hepatitis due to Virus A and only 0.00004 ml. from patients with serum hepatitis (Virus B) have produced disease in human volunteers.[1] In view of the latter, along with experimental evidence indicating the ease with which needles and syringes become contaminated with blood after injections,[4,5] both dentists and physicians should be concerned with the possibility of transmitting viral hepatitis.

Resistance to Disinfecting Agents • Since neither Virus A nor Virus B have been isolated in cultures, or by animal inoculation, relatively little data are available as to their degree of resistance to physical and chemical agents of destruction. It has been reported that Virus B survives 60°C. water for one hour, but may be inactivated by a similar temperature for ten hours.[6]

Virus B is not inactivated in serum containing thimerosal (Merthiolate) in concentrations of 1/2000 or in 0.2 per cent concentration of tricresol.[7] Virus A is known to survive 1 ppm chlorine in water for 30 minutes but is attenuated by 15 ppm.[5] Nitrogen mustard in a con-

centration of 500 mg. per milliliter failed to inactivate a strain of Virus B though such concentrations did inactivate such other viruses as influenza.[8]

Indirect evidence of the relative resistance of Virus B is noted by Salaman and associates[9] in a discussion of two technics for the disinfection of syringes and needles used for treatment of syphilis. In the first technic needles and syringes were boiled at the start of each day. After injection of the medicament, the needle was removed and boiled and the syringe was rinsed under tap water, and if an adequate number of syringes were available, they were left for a short time in industrial alcohol, biniodide of mercury or weak saponated cresol solution (Lysol). The syringe was then fitted with a freshly boiled needle and used for another injection. After this procedure, 37 per cent of 67 patients treated for 120 days and 68 per cent of 56 patients treated for 180 days developed viral hepatitis. After this experience, all needles and syringes were heated at 150 to 160°C. dry heat for one hour before giving injections. The incidence of hepatitis was reduced to 1 (2.7 per cent) of 36 patients treated 120 days and to 1 (5.6 per cent) of 18 treated 180 days.

Further evidence is noted in a report of a serious outbreak of homologous serum hepatitis in 1946-1947 involving 112 patients of one physician, and including 12 deaths. It was stated that because of the large numbers of individuals treated by this physician, he often used only four minutes for boiling instruments.[10]

In a comprehensive consideration of the problem of viral hepatitis infections, Perkins[11] states that the commonly used methods of "sterilizing" needles, syringes and lancets by brief exposure to boiling water or immersion in chemical disinfectants are recognized as inadequate for the destruction of the virus. Perkins also stresses that the National Institutes of Health stipulate that apparatus and instruments capable of transmitting serum hepatitis from one person to another be heat sterilized by autoclaving 30 minutes at 121°C. (15 lb.), by dry heat for two hours at 170°C. or by boiling in water for 30 minutes. Eichenwald and Mosley[1] feel that from epidemiologic reports it seems probable that sterilization by 160°C. dry heat for one hour may be adequate.

The necessity of sufficiently high temperature, as previously mentioned, along with doubt as to effectiveness of chemical disinfectants, for killing hepatitis viruses on instruments, has also been stressed by WHO Expert Committee on Hepatitis.[2] In a further consideration of chemical disinfectants, it has been mentioned by Kersten[12] that even though there were chemical disinfectants capable of destroying the viruses of hepatitis, this type of sterilization is not acceptable for hypodermic needles. The small lumen of the conventional local anesthetic needle very often traps air that prevents the liquid disinfectant from penetrating the entire length of the needle. Evidence of the latter assumption has been noted in both reported[13] and unreported studies in the author's laboratories. In these experiments sterile crosscut fissure dental burs were contaminated with cultures of *Staphylococcus aureus*. Earlier experiments showed that these organisms failed to survive for five minutes if placed directly into the test chemicals, yet on the dental burs the same strains of bacteria were often viable after 5 to 15 minutes exposure to the chemicals. On the other hand, similar contaminated burs were invariably sterilized if placed in 100°C. water for five minutes. These experiments suggest the difficulty of killing all organisms in cracks and crevices of instruments with chemicals.

Evidence of Transmission Through Dental Procedures • Because of the long and varied incubation periods it is difficult to prove that a given injection, or series of

injections, accounted for a case of hepatitis due to either Virus A or Virus B. On the other hand, since Virus B is probably transmitted only by parenteral introduction, there is more reason to suspect a given dentist or physician if a patient received injections only from one doctor, and then develops viral hepatitis within the probable limits of the incubation stage of the disease.

Thompson and associates[14] reviewed 203 cases of viral hepatitis in patients treated in one hospital and found that four (2 per cent) developed symptoms between 26 to 120 days after injections of anesthetics and extraction of teeth. These authors were unable to determine the method of sterilization used by the dentists. In the same report, viral hepatitis was noted in one patient out of 208 who had been treated by one dentist 64 days prior to the dentist's admission to the hospital as a viral hepatitis patient. It is of interest to note that the latter dentist autoclaved all instruments before use on patients. He did, however, have eczematoid dermatitis on his hands and although he wore autoclaved gloves, it was still thought that the dermatitis was a possible reason for transmission. Thompson and associates concluded that, (1) although occurrences of viral hepatitis after dental procedures are unusual, they are not rare, and (2) the likelihood of a dentist with the disease transmitting it to a patient is small.

In an article on occurrence of serum hepatitis in U. S. troops in Germany, Evans[15] includes two soldiers who had a history of dental operations prior to development of this disease. One of the soldiers also had a history of an injection of penicillin and the other, of removal of sutures from his leg in addition to dental operations.

The most impressive evidence has been reported by Foley and Gutheim[16] in a survey of patients discharged from the medical service of a hospital. The survey covered a two-year period and included 57 patients with viral hepatitis. Seven of the patients were considered to have serum hepatitis as a result of blood or plasma transfusions. The remaining 50 patients ordinarily would have been considered to have infectious hepatitis. Fifteen of them, however, gave a history of an injection by a dentist during the preceding 1 to 6 months. Thirteen had had injections prior to the extraction of teeth and two had had injections in connection with cavity preparations. In addition, two of the 51 patients had received procaine and penicillin injections simultaneously. The authors state that the evidence supported the diagnosis of serum hepatitis as a result of the dental work. "It is unlikely," they conclude, "that such a large percentage of hepatitis patients could have had injections by a dentist just by chance."

DISCUSSION AND SUMMARY

The preceding case reports are not absolutely conclusive proof of the dentist's guilt in transmitting viral hepatitis infection because it is possible that other injections may have been made during the long incubation periods. These reports, however, do offer very good circumstantial evidence. Furthermore, because of the long and variable incubation periods, it is quite possible that dentists may be responsible for transmission of a number of unreported instances of viral hepatitis.

The probability, or even remote possibility, of transmitting Virus A or Virus B should influence dentists to use every possible precaution to sterilize all instruments capable of transferring blood or blood products from one patient to another. Although the use of needles and syringes is the most likely avenue of such transfers, it should be remembered that instruments such as scalpels, forceps, periodontal instruments and others that are used to penetrate tissues are always potential carriers of the viruses in blood or

blood products unless they are adequately sterilized.

In addition to contaminated instruments, the use of a cartridge of anesthetic for injection into more than one patient must be condemned as a definite hazard. Results of a survey made by Zinner and Streitfeld[18] indicate that the latter may have occurred much too often in dental offices.

In reference to instruments we agree with an editorial comment by Eisenbud:[17] "In the absence of definite and final knowledge regarding the sterilization requirements for this virus, the technic recommended by most microbiologists at this time for needles, syringes and cutting instruments is autoclaving. In its absence, boiling for a period of 30 minutes is acceptable. Sterilization by chemical means is unacceptable."

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1. Eichenwald, H. F., and Mosley, J. W. Viral hepatitis, clinical and public health aspects. Public Health Service Publication No. 435. Washington, D.C., U. S. Government Printing Office, 1959.

2. Expert Committee on Hepatitis. World Health Organization Technical Report Series No. 62. March, 1953.

3. Smith, D. T., and Conant, N. F. Zinsser's microbiology, ed. 12. New York, Appleton-Century-Crofts, Inc., 1960, p. 768.

4. Streitfeld, M. M., and Zinner, D. D. Microbiologic hazards of local dental anesthesia. II. Pilot study of involuntary aspiration of bacteria into hypodermic needles and anesthetic cartridges after injection. J.A.D.A. 57:657 Nov. 1958.

5. Topley, W. W. C., and Wilson, G. S. Topley and Wilson's principles of bacteriology and immunity, ed. 4. G. S. Wilson and A. A. Miles, eds. Baltimore, Williams & Wilkins Co., 1955, p. 2207.

6. Havens, Jr., W. P. Hepatitis, yellow fever and dengue. Ann. Rev. Microbiol. 8:289, 1954.

7. Havens, Jr., W. P., and Paul, J. R. Viral and rickettsial infections of man, ed. 3. T. M. Rivers and F. L. Horsfall, eds. Philadelphia, J. B. Lippincott Co., 1959, chapter 27.

8. Drake, M. E., and others. Effect of nitrogen mustard on virus of serum hepatitis in whole blood. Proc. Soc. Exper. Biol. & Med. 80:310 June 1952.

9. Salaman, M. H., and others. Prevention of jaundice resulting from antisyphilic treatment. Lancet 2:7 July 1, 1944.

10. Foreign letters. Epidemic of homologous serum hepatitis. J.A.M.A. 137:209 May 8, 1948.

11. Perkins, J. J. Principles and methods of sterilization. Springfield, Charles C Thomas, 1954, p. 43.

12. Kersten, R. B. Dentists and infectious hepatitis. (Ed.) J. Michigan D. A. 41:308 Nov. 1959.

13. Knighton, H. T. Studies on the use of chemical antiseptics and germicides in dentistry. Washington Univ. D. J. 16:123 May 1950.

14. Thompson, Jr., J. L., and others. Transmission of viral hepatitis by dental procedures. J. M. A. Alabama 23:45 Aug. 1953.

15. Evans, A. S. Serum hepatitis in U. S. troops in Germany. Proc. Soc. Exper. Biol. & Med. 75:809 Dec. 1950.

16. Foley, F. E., and Gutheim, R. N. Serum hepatitis following dental procedures: a presentation of 15 cases including three fatalities. Ann. Int. Med. 45:369 Sept. 1956.

17. Eisenbud, Leon. Serum hepatitis in dental patients. (Ed.) New York J. Den. 27:177 May 1957.

18. Zinner, D. D., and Streitfeld, M. M. Microbiologic hazards of local dental anesthesia. I. State-wide survey of procedures in common practice. J.A.D.A. 56:508 April 1958.

Organization • The difference between throwing out ideas and writing a well organized book may be compared to the difference between casual flirtations and a responsible marriage. *George Sarton. Notes on the Reviewing of Learned Books. Science 131:1186 April 22, 1960.*

Clinical evaluation of mepivacaine hydrochloride by a new method

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A controlled blind test procedure that can be used in the comparison of anesthetic solutions in a school clinic has been developed. Four solutions of mepivacaine hydrochloride were compared with the control solution, propoxycaine hydrochloride 0.4 per cent, procaine hydrochloride 2 per cent, and levo-nordefrin 1:20,000. The results indicate that mepivacaine is the first safe local anesthetic agent to produce satisfactory anesthesia for dental procedures without the benefit of a vasoconstrictor.

The object of this study was to determine the clinical tolerance of patients for the new local anesthetic, mepivacaine hydrochloride (Carbocaine), and the concentration required to complete successfully all types of procedures in the operative clinic of Temple University's School of Dentistry. A number of investigational groups have reported extensively on the pharmacologic activity of mepivacaine. The most recent to report was the group headed by Luduena.[1]

Although the blind method of testing drugs, first reported in the dental literature by Tainter, Throndson and Moose,[2] is accepted as the standard for the comparison of clinically different local anesthetic solutions, the following procedure provides a rapid, efficient method of evaluating solutions in a busy dental operative clinic.

MATERIALS

All five sterile isotonic local anesthetic solutions,[3] mepivacaine hydrochloride 2 and 3 per cent, mepivacaine hydrochloride 2 per cent with levo-nordefrin both 1:40,000 and 1:20,000, and propoxycaine hydrochloride 0.4 per cent with procaine hydrochloride 2 per cent and levo-nordefrin 1:20,000, were supplied in identical dental cartridges marked only by a control number printed on each cartridge. At least three different code numbers were assigned to each local anesthetic solution. All the cartridges under test were mixed indiscriminately with cartridges of the control solution, in cans of 50.

An anesthetic case record card, similar to that used by Dobbs, DeVier and Rapoport,[4] and by Tainter, Wessinger and Lee,[5] and a "duration postcard" were provided with every cartridge.

CLINIC PROCEDURE

The person responsible for issuing supplies recorded the control number of every cartridge dispensed to assure use of the same solution if the patient required an additional injection. A presterilized needle and syringe were assembled and issued at this time.

To insure that the students, instructors and the administrator maintained an objective attitude throughout the study, the key to the code of control numbers was kept by the administrator in a sealed envelope until the data from the cards were tabulated and analyzed.

The following data were recorded on the anesthetic case record card by the instructor prior to injection of the local anesthetic solution: patient's case number; patient's initials; sex; age; weight; cartridge code; area of operation; type of injection; medical condition of patient, taken from case record chart, and emotional state of patient at time of injection.

The clinical procedure for evaluation included the following steps:

1. Student had his watch ready.
2. Instructor prepared the tissues for injection.
3. Student recorded the time of day (hour, minute, second) on the bracket table paper cover when the word "insertion" was spoken by the instructor.
4. After a 30 second lapse by the second hand, the student started a countdown for 30 seconds. This insured a total injection time of the solution in the cartridge from a minimum of 45 seconds to a maximum of 60 seconds.
5. Student noted on the paper cover, below the time noted for insertion, the exact time of day the needle was removed.
6. Instructor recorded volume injected and remained with the patient to observe and fill in on the anesthetic case record card the time of day when the first symptoms of anesthesia developed.
7. Instructor observed and recorded on the card the presence or absence of a reaction at the time of injection and while anesthesia was developing. Postoperative reactions were recorded at the next appointment.
8. Student recorded on the bracket table paper cover the time cavity preparation was started and completed.
9. Instructor recorded grade of anesthesia on card at time cavity preparation was started.
10. Instructor frequently checked each patient to whom he had given an injection during the clinic period. If during the course of operation the tooth became sensitive, the time of day was entered on the record card under "Remarks," another injection was given and the additional volume recorded.
11. Instructor checked for symptoms of anesthesia at time patient was dismissed and issued a "duration postcard," if necessary.
12. Patient was instructed to record on the card the time of day when mouth returned to normal and to mail the postcard to the clinic.
13. Administrator received "duration postcards" and completed the patient's case record card.

From the afore-mentioned, it can be seen that the student made all his notations on the bracket table paper cover, and that only the instructors (who transferred these data to the cards) and the administrator were responsible for the accuracy of the information on the case record cards.

METHODS OF GRADING

The grades of anesthesia and their criteria were set forth on the case record card. Grading was determined at the beginning of the operation, with a grade "A" signifying complete elimination of pain at the site of operation. Grade "B" indicated the presence of some discomfort but, in the opinion of the operator, another injection was not required. Grade "C" was

Table 1 • Degree of anesthesia (in per cent ± standard deviation) obtained with solutions of mepivacaine HCl and the control solution

Solution	No. of patients	Degree or grade of anesthesia		
		A	B	C
A	130	90.00 ± 2.63	3.85 ± 1.69	6.15 ± 2.10
B	142	97.18 ± 1.39	1.41 ± 0.99	1.41 ± 0.99
C	181	92.27 ± 1.98	4.42 ± 1.53	2.76 ± 1.22
D	68	83.82 ± 4.47	8.82 ± 3.44	7.35 ± 3.16
E	71	97.18 ± 1.96	2.82 ± 1.96	0
Total	592			

recorded only when it was evident, as the operation was started, that anesthesia was unsatisfactory and that reinjection was necessary. Even though satisfactory anesthesia resulted from the second injection and, in the opinion of the operator, the first injection was misplaced, the "C" rating was not altered.

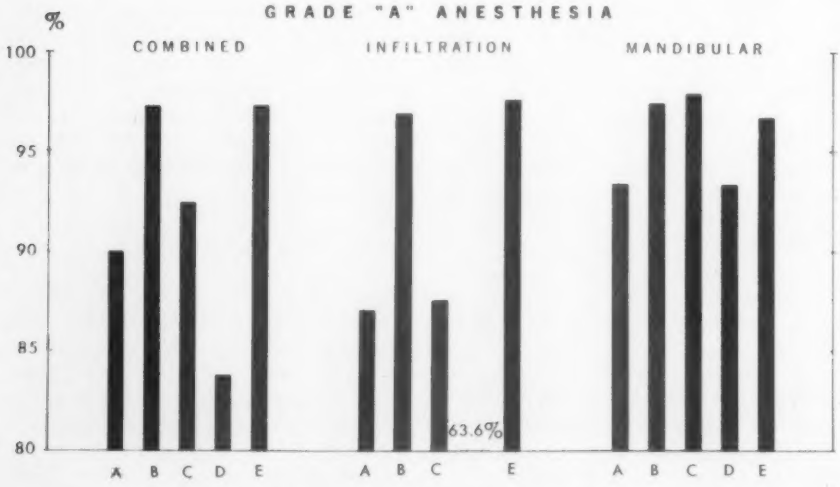
Conversely an "A" rating was not altered when sensitivity returned to the tooth during the course of the operation since this response pertained to duration rather than to degree of anesthesia.

RESULTS

The results recorded in Tables 1 through 4 and in the illustration with anesthetic solutions A, B, C, D and E refer to the results obtained with the use of the following sterile, isotonic anesthetic solutions:

Propoxycaine HCl 0.4 per cent, procaine HCl 2 per cent, levo-nordefrin 1:20,000. Solution A-Control

Mepivacaine HCl 2 per cent, levo-nordefrin 1:40,000. Solution B



Results obtained with Solutions A, B, C, D and E

Table 2 • Degree of anesthesia (in per cent ± standard deviation) obtained with solutions of mepivacaine HCl and the control solution according to method of administration

Type of injection and solution	No. of patients	Degree or grade of anesthesia		
		A	B	C
Infiltration:				
A	69	86.96 ± 4.05	4.35 ± 2.46	8.70 ± 3.39
B	64	96.88 ± 2.17	1.56 ± 1.55	1.56 ± 1.55
C	88	87.50 ± 3.53	7.95 ± 2.88	4.55 ± 2.22
D	22	63.64 ± 10.24	18.18 ± 8.27	18.18 ± 8.27
E	40	97.50 ± 2.47	2.50 ± 2.47	0
Mandibular:				
A	60	93.33 ± 3.22	3.33 ± 2.32	3.33 ± 2.32
B	78	97.44 ± 1.79	1.28 ± 1.27	1.28 ± 1.27
C	91	97.80 ± 1.54	1.10 ± 1.09	1.10 ± 1.09
D	45	93.33 ± 3.72	4.44 ± 3.07	2.22 ± 2.20
E	31	96.77 ± 3.17	3.23 ± 3.17	0
Types of injection other than infiltration and mandibular				
A	1	100.00		
C	2	100.00		
D	1	100.00		
Total	592			

Mepivacaine HCl 3 per cent. Solution C

Mepivacaine HCl 2 per cent. Solution D

Mepivacaine HCl 2 per cent, levonordefrin 1:20,000. Solution E.

Degree of Anesthesia • The average degree of anesthesia obtained with each of the five different anesthetic solutions used in operative dentistry on 592 patients by three instructors is presented in Tables 1 and 2. The results indicate that Solutions B and E (the solutions of mepivacaine hydrochloride with a vasoconstrictor) provided satisfactory anesthesia more consistently than did the other solutions. In Table 1 the degree of anesthesia is recorded in relation to solution only, whereas in Table 2 the results are further broken down according to various methods of administration—infiltration, mandibular and other types of injections. These results are also shown graphically in the illustration.

The incidence of grade "A" anesthesia provided by mepivacaine hydrochloride with a vasoconstrictor when infiltrated into the upper jaw was significantly greater than that provided by the other solutions. No significant differences, however, were noted among the various solutions when mandibular injections were made.

Duration of Anesthesia • The duration of anesthesia as measured in this study is the total duration of symptoms of anesthesia in the tissues, and not anesthesia of the tooth or operating anesthesia which is of shorter duration. Data on the latter, that is, duration of operating anesthesia, obtained in 52 patients, are presented in Table 3.

The more prolonged duration of anesthesia afforded by mepivacaine hydrochloride with a vasoconstrictor, as indicated in Table 4, is well suited to the special needs of students.

Mepivacaine hydrochloride 3 per cent without a vasoconstrictor (Solution C) and the control solution which contained

Table 3 • Duration of operating anesthesia of solutions of mepivacaine HCl and the control solution according to method of administration

Type of injection and solution	No. of patients*	Duration (in min. ± S.D.)
All types combined:		
A	10	44.10 ± 5.73
B	6	52.16 ± 7.95
C	22	41.32 ± 3.52
D	8	40.00 ± 8.50
E	6	60.67 ± 9.39
Infiltration:		
A	7	44.86 ± 8.31
B	4	56.00 ± 11.67
C	17	41.71 ± 4.11
D	7	32.43 ± 4.47
E	3	76.33 ± 6.77
Mandibular:		
A	2	41.00 ± 4.00
B	2	44.50 ± 6.50
C	5	40.00 ± 7.45
D	1	93.00
E	3	45.00 ± 12.22
Types of injection other than infiltration and mandibular		
A	1	45.00

*Calculated on basis of only those patients reporting information.

a vasoconstrictor (Solution A) produced significantly shorter anesthetic effects than the mepivacaine hydrochloride solutions with a vasoconstrictor (Solutions B and E). The even shorter duration of anesthetic effect of mepivacaine hydrochloride 2 per cent without a vasoconstrictor (Solution D) may account somewhat for the higher incidence of grades "B" and "C" anesthesia recorded for infiltration injections. The effect of the 2 per cent concentration was significantly shorter both for soft tissue and operating anesthesia than that of mepivacaine hydrochloride 3 per cent. It is believed that in some patients the infiltration anesthesia produced by the weaker concentration had begun to wear off at the time the student was ready to operate.

Onset of Anesthesia • The onset or induction time of anesthesia as measured in this study was the interval of time between removal of the needle and the onset of symptoms of anesthesia in the tissues. Frequently symptoms of anesthesia were perceived before the needle was withdrawn and in such instances the onset time was marked "immediate" and calculated as 0 minutes.

As noted in Table 4 the average onset time of anesthesia by infiltration using mepivacaine hydrochloric e 2 per cent (37.2 seconds) was somewhat faster than that obtained with the other solutions. No significant differences in the onset of anesthesia were apparent with the other solutions, and the low figure for mepivacaine hydrochloride 2 per cent may not be significant in view of the relatively small number of cases reported.

Mepivacaine hydrochloride 2 per cent with levo-nordefrin 1:20,000, (Solution E) when administered by mandibular block, produced significantly more rapid anesthesia (having an average onset of 64.2 seconds), than did the other solutions with the exception of mepivacaine hydrochloride 2 per cent. All the solutions performed efficiently in this respect.

Tolerance • The few systemic and local postoperative reactions recorded in this study were mild. Actually, the former were attributed by the operators to the patient's state of apprehension rather than to the toxic effect of the agents injected. Similarly, the postoperative local reactions, with few exceptions, are believed to be the result of needle trauma.

No significant differences in local or systemic tolerance between the solutions were revealed in this study. The average incidence of lack of systemic reactions for all solutions ranged from 96.92 ± 1.52 per cent to 100 per cent.

DISCUSSION

A study comparing the results obtained with the use of seven commercial local anesthetic solutions in the operative clinic of a dental school was reported by

Kramer[6] in 1958. Since the injections were administered by 60 different dental students, this investigator was of the opinion that the incidence of Grade "A" anesthesia would have been higher, particularly for mandibular anesthesia, if the injections had been performed by more experienced operators. It is interesting to note that Kramer reported an incidence of 80.1 per cent Grade "A" mandibular anesthesia for the mixture containing propoxycaine hydrochloride 0.4 per cent, procaine hydrochloride 2 per cent, and levarterenol 1:30,000, as compared to an incidence of 76.0 per cent for lidocaine hydrochloride with epinephrine 1:100,000; the study reported here reveals an average incidence of 93.33 per cent Grade "A" for the control solution (similar to the solution used by Kramer) as compared to 97.44 per cent for mepivacaine hydrochloride 2 per cent with levo-nordefrin 1:40,000. The difference in results between the two solutions used in both studies is clearly attributable to the superior skill of the instructors.

Mumford and Gray[7] in a report on a blind clinical study in which 2 per cent solutions of mepivacaine hydrochloride and lidocaine hydrochloride without vasoconstrictors were used noted that 83.8 per cent of the mepivacaine injections were effective as compared to 48.3 per cent for lidocaine, a significant difference. It is interesting to observe that the average incidence of satisfactory anesthesia recorded for mepivacaine hydrochloride 2 per cent is nearly identical in both studies.

Additional support is found in the common observation that the mepivacaine hydrochloride 2 per cent solution provides satisfactory anesthesia more consistently when used for mandibular than

Table 4 • Time of onset and duration of symptoms of anesthesia

Type of injection and solution	Onset time (in min.)		Duration (in min.)	
	No. of patients*	Ave. ± S.D.	No. of patients*	Ave. ± S.D.
All types combined:				
A	128	1.17 ± 0.11	106	178.45 ± 5.54
B	139	1.17 ± 0.09	124	204.52 ± 6.81
C	178	1.12 ± 0.07	142	167.95 ± 7.32
D	68	1.02 ± 0.12	55	142.45 ± 9.14
E	71	0.86 ± 0.08	68	215.56 ± 8.35
Infiltration:				
A	68	0.84 ± 0.07	51	153.71 ± 7.67
B	62	0.89 ± 0.06	53	170.64 ± 12.50
C	86	0.83 ± 0.06	59	132.56 ± 10.69
D	22	0.62 ± 0.11	13	76.15 ± 15.10
E	40	0.70 ± 0.09	38	184.03 ± 10.37
Mandibular:				
A	59	1.55 ± 0.20	54	200.87 ± 6.76
B	77	1.41 ± 0.14	71	229.82 ± 5.87
C	90	1.40 ± 0.12	82	193.11 ± 9.14
D	45	1.20 ± 0.16	41	161.07 ± 8.96
E	31	1.07 ± 0.15	30	255.50 ± 9.66
Types of injection other than infiltration and mandibular				
A	1	0.80	1	230.00
C	2	0.65 ± 0.05	1	193.00
D	1	1.50	1	241.00

*Calculated on basis of only those patients reporting information.

for infiltration injections. Our results indicate that mepivacaine hydrochloride 3 per cent should be more satisfactory than the 2 per cent concentration for short procedures in general practice.

On the basis of our experience with other anesthetic agents and with the new local anesthetic under test, we are of the opinion that mepivacaine hydrochloride is the first safe local anesthetic agent to produce satisfactory anesthesia for dental procedures without the benefit of a vasoconstrictor.

The students participating in this study received invaluable instruction in the technic of administering local anesthetics, as well as a better appreciation of the fundamental principles of local anesthesia.

SUMMARY AND CONCLUSIONS

1. A controlled blind test procedure that can be used in the comparison of local anesthetic solutions rapidly and efficiently in a busy school clinic has been developed. Five local anesthetic solutions —mepivacaine hydrochloride 2 and 3 per cent; mepivacaine hydrochloride 2 per cent with levo-nordefrin both 1:40,000 and 1:20,000, and propoxycaine hydrochloride 0.4 per cent with procaine hydrochloride 2 per cent and levo-nordefrin 1:20,000—were administered by instructors either by infiltration, mandibular or other type injection to 592 patients.

2. Mepivacaine hydrochloride was well tolerated in the concentrations used, that is, 2 per cent and 3 per cent.

3. Mepivacaine hydrochloride 2 per cent without a vasoconstrictor produced a satisfactory intensity or degree of anesthesia; however, the duration of effect was not always sufficient for students working under the conditions present in a busy clinic.

4. Mepivacaine hydrochloride 3 per cent without a vasoconstrictor produced satisfactory anesthesia rapidly and more consistently than the 2 per cent concentration without a vasoconstrictor; this former solution was significantly superior when used for infiltration.

5. Solutions of mepivacaine hydrochloride 2 per cent with the vasoconstrictor, levo-nordefrin both 1:40,000 and 1:20,000 were observed to be the most consistent in providing efficient, profound, well-tolerated anesthesia and sufficient operating duration to make either formula satisfactory for student use.

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1. Luduena, F. P., and others. Pharmacology and toxicology of mepivacaine, a new local anesthetic. Toxicol. & Appl. Pharmacol. 2:295 May 1960.

2. Tainter, M. L.; Throndson, A. H., and Moose, S. Comparison of procaine hydrochloride and procaine borate (borocaine) as local anesthetics. J.A.D.A. & D. Cosmos 24:376 March 1937.

3. Prepared by Cook-Waite Laboratories, Inc.

4. Dobbs, E. C.; DeVier, C. W., Jr., and Rapoport, L. A new local anesthetic agent. J.A.D.A. 48:409 April 1954.

5. Tainter, M. L.; Wessinger, G. D., and Lee, J. W. New local anesthetic solutions containing propoxycaine. J.A.D.A. 51:19 July 1955.

6. Kramer, W. S. A comparative clinical evaluation of some commonly used local anesthetic compounds. J.A.D.A. 56:820 June 1958.

7. Mumford, J. M., and Gray, T. C. Dental trial of Carbocaine. Brit. J. Anaesth. 29:210 May 1957.

Fruit of Knowledge • In knowledge, as in nature, fruit grows on trees and cannot be raised directly on the soil by short cuts bypassing the tree. *Paul Weiss. Knowledge: a Growth Process. Science 131:1717 June 10, 1960.*

A study of a new medicament in the chemomechanical preparation of infected root canals

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The effectiveness of Gly-Oxide (a solution of 10 per cent urea peroxide in a vehicle of anhydrous peroxide) was compared with that of aqueous hydrogen peroxide in the chemomechanical preparation of infected root canals in 77 single-rooted teeth. With both solutions, growth-free cultures were obtained in more than 90 per cent of instances after the initial cleansing and enlarging of the canal. However, with the initial culture at the second visit, Gly-Oxide was substantially more efficient than aqueous hydrogen peroxide in producing growth-free cultures (65.7 per cent versus 48.5 per cent).

The leading endodontic textbooks stress the need for thorough cleansing and enlarging of the root canal as part of good therapy. The importance of these procedures was statistically established by Auerbach[1] and by Stewart[2] in two different clinical studies.

From time to time, various chemical substances have been recommended as aids in the chemomechanical preparation of the canal. The most popular of these contain chlorine. Coolidge and Kesel[3] recommended the use of an alkaline solution. Sommer, Ostrander and Crowley[4] suggested sodium hypochlorite solution, N.F., and tincture of green soap for irrigation. Grossman[5] showed the effect of a double strength sodium hypochlorite solution in dissolving necrotic pulp tissue and suggested that it be reacted with hydrogen peroxide to aid further in the debridement of the canal.

In a recent paper by Marshall, Massler, and Dute,[6] the effects of permeability of the root dentin were demonstrated after using various chemical agents in the root canal preparation. They state:

> Hydrogen peroxide and sodium hypochlorite solutions, used alternately, produced a significant increase in dentin permeability to isotopes.

The results of their study suggest that greater penetration of medicaments can be expected after the use of hydrogen peroxide and sodium hypochlorite; thus the medicaments more readily destroy microorganisms that have penetrated into the dentin tubules and fine lateral canals.

PURPOSE

The purpose of the present study was to compare the effectiveness of Gly-Oxide[7] (a solution of 10 per cent urea peroxide in a vehicle of anhydrous glycerol) with

that of aqueous hydrogen peroxide in the chemomechanical preparation of infected root canals. The stated advantages of Gly-Oxide are improved antibacterial action, stability at room temperature, a slower liberation of oxygen when it contacts body fluids or infected material, and a more prolonged action in this regard. Brown[8] wrote a number of articles discussing a 4 per cent urea peroxide in glycerine. He was interested in developing an antiseptic compound that would be as efficient as hydrogen peroxide in its detergent activity and deodorizing qualities, yet would be far more stable and predictable in its activities than the present 3 per cent aqueous variety. Also he wanted one which would retain under conditions of use the antimicrobial action that has been exhibited by aqueous peroxide in the test tube only.

In recent experimental work Cobe[9] was able to demonstrate that Gly-Oxide retained antimicrobial action in the presence of blood, whereas aqueous peroxide did not. This improved activity was felt to be due to the slower breakdown of the peroxide in the presence of blood fluids rich in enzymes.

PROCEDURE

Only single-rooted teeth were used in this study. All the regular precautions were observed; namely, placing the tooth under a rubber dam, sterilizing the field of operation and sterilizing all instruments prior to use. After entrance had been made into the pulp chamber, a culture (Cu no. 1) was obtained. This was done in the usual fashion by placing the sterile absorbent point through the pulp chamber, and as far as possible into the canal, and sampling the contents. This point was then transferred to the culture tube and incubated. Each specimen was returned to the bacteriological laboratory where determination was made as to the type of organism or organisms present. The medium used for culturing was the Trypticase Soy Broth with a 0.2 per cent agar as suggested recently by Cobe.[10] This is a modification of the medium suggested by Leavitt, Naidorf, and Shugaevsky.[11]

When the Gly-Oxide was used, a 21 gauge needle and Luer-Lok syringe were employed to deposit several drops of the substance in the chamber of the tooth to be treated. It was then pumped into the canal gently and, where possible, the pulp tissue was removed with a barbed broach. The canal was then flushed with a sodium hypochlorite solution (Zonite), and again the peroxide material was added to the chamber. All the mechanical preparation was completed using a step-wise procedure from the smallest instrument to the largest and gradually cleaning the debris from the canal. Alternate chemical substances were used until all traces of debris had been removed. When the canal was enlarged to its final size, it was flushed repeatedly with the hypochlorite solution until all effervescence had ceased. The canal was then irrigated further with 2 cc. of sterile distilled water to wash out any remaining hypochlorite solution, and carefully dried with sterile absorbent points prior to taking culture no. 2.

A small pledget of sterile dry cotton was sealed into the pulp chamber. This was covered with a layer of gutta-percha or temporary stopping and an outer layer of cement. The double seal was used to prevent contamination between sessions. No medication was sealed in the pulp chamber between visit one and visit two. The same procedure was used when the regular aqueous 3 per cent hydrogen peroxide was used for irrigating purposes during the chemomechanical preparation of the canal. Teeth were selected alternately. First, one material was used and, in the next instance, the other material was used. This procedure was followed in the hope of having an equal number of instances for both types of peroxide being considered in this series.

Table 1 • Distribution of teeth treated and results obtained through culture technic

	Teeth treated	Cu no. 2 (+)	Cu no. 2 % (−)	Cu no. 3 (+)	Cu no. 3 % (−)	Change of organism
Gly-Oxide	44	1	97.7	15	65.7	4
Aqueous 3% peroxide	33	3	90.9	17	48.5	5

At the second visit, the tooth was again isolated and treated as before, taking all measures to work in an aseptic field. After the temporary fillings were removed and before any irrigating solutions were placed in the chamber, culture no. 3 was taken. If further instrumentation was deemed necessary, it was done at this time and the tooth treated with medicaments of the operator's choice. We were primarily interested in the three cultures; namely, the preoperative culture (Cu no. 1), the culture immediately after instrumentation before ending the first visit (Cu no. 2), and the initial culture at the second visit (Cu no. 3).

Table 2 • Organisms isolated, culture no. 1

Organism	Cu no. 1
Streptococcus alpha	40
Strep. beta	1
Strep. gamma	2
Staphylococcus albus	14
Diptheriae pneumonia	3
Neisseria catarrhalis	8
Staph. aureus	5
Pseudomonas aeruginosa	2
Proteus vulgaris	2

RESULTS

Seventy-seven teeth were treated in this series (Table 1). Forty-four teeth were treated using Gly-Oxide during the chemomechanical preparation and 33 teeth using 3 per cent aqueous hydrogen peroxide during instrumentation. All the teeth reported in this study were infected. The organisms isolated were identified (Table 2). As previously described, culture no. 2 was taken immediately after the completion of chemomechanical preparation. In the Gly-Oxide series, 97.7 per cent were free of microbial growth as tested. Of the 44 teeth treated, only one gave a positive no. 2 culture. In the aqueous hydrogen peroxide series, of the 33 teeth treated, three of the cultures were positive to growth, giving a reading of 90.9 per cent growth-free cultures.

In the Gly-Oxide series, in culture no. 3, there were 15 positive cultures, giving a 65.7 per cent growth-free culture. In the hydrogen peroxide series for culture no. 3, of the 33 teeth treated, 17 teeth were positive to growth, giving a total of 48.5 per cent growth-free culture.

DISCUSSION

Chemomechanical preparation serves a number of purposes. It helps to remove the necrotic tissue from the root canal and pulp chamber and also any toxic products that might have been present. In addition it is used to enlarge the volume of the root canal so that a greater quantity of medication can be sealed into the canal.[12] It is useful in smoothing the walls of the canal, which permits better, simpler obturation. It is hoped that after chemomechanical preparation all the microorganisms that were present in the canal have been eliminated. The culture technic, as used, is a measure of the efficiency in chemomechanical preparation. It will be noted that in both instances when the Gly-Oxide was used, and also when the aqueous hydrogen peroxide was used, we had a very high incidence of growth-free no. 2 cultures, indicating that these substances are at

least useful in helping to eliminate the microbial life present in the canal. In culture no. 3, however, there was a difference (65.7 as against 48.5 per cent) in the number of growth-free cultures obtainable when the two different substances were used in similar fashion during chemomechanical preparation. In our opinion the Gly-Oxide seemed to be superior when compared with the aqueous hydrogen peroxide in this series.

In comparing the results in this series with those reported previously by Stewart,[2] the Gly-Oxide figures seem to be comparable to the results obtained when the aqueous hydrogen peroxide was used with the hypochlorite solution during chemomechanical preparation. When the results of the aqueous hydrogen peroxide series in this new study are compared with the series in the old study, there is a considerable variation. In all probability this variation is due to two factors. First, in the earlier study, sterile distilled water was not used to flush the canal prior to taking cultures, and it is conceivable that a sufficient quantity of sodium hypochlorite, in spite of all the efforts to dry it from the canal, might have been carried into the culture medium to give false negative culture results. In the present series, we used the sterile distilled water to prevent this type of error. A second possibility for variation in results is the different culture medium used in the previous paper; that is, brain heart infusion broth. It is felt that the Trypticase Soy Broth with the 0.2 per cent agar used in the new series is a more sensitive medium, since it is able to pick up both aerobic and anaerobic types of microbial organism. According to the report of Leavitt, Naidorf, and Shugaevsky,[11] and the one by Cobe,[10] this new medium appears to be superior to the brain heart infusion broth. In a personal communication from I. B. Bender of Philadelphia, he stated that he was unable to detect the greater sensitivity of the Trypticase Soy Broth.

Auerbach[1] reports:

> In this study 93 per cent of the teeth yielded a positive pretreatment culture. Of these infected canals, 78 per cent yielded a negative culture following debridement and cleansing of the canals.

The 78 per cent is a significant figure and points to the importance of thorough chemomechanical preparation. It is equivalent to the figures reported for culture no. 2 of this series. The method that he used was different from that reported by Stewart in this paper or in the previous paper. Auerbach[1] describes his method as follows:

> The canal was flooded with chlorinated soda double strength. With this material in the canal, the walls were thoroughly cleaned and smoothed with files and reamers. The canal was then repeatedly flushed with hot sterile distilled water and then dried thoroughly with sterile paper points. Before placing a dressing and sealing the tooth, a culture was again taken. A sterile paper point was dipped in the culture medium and placed as close as possible to the periapical foramen. This second culture served to show what effect the instrumentation has had on the original bacteriostasis of the canal.

It would seem, then, from the results presented in the previous paper by Stewart and also those in this paper that the repeated flushing of the canal with the hydrogen peroxide and the sodium hypochlorite seems to yield a higher percentage of growth-free cultures than when the hypochlorite solution is used alone and the canal is then flushed with sterile distilled water. The results of Marshall, Massler and Dute,[6] as referred to earlier in the paper, were impressive when they used the alternating hypochlorite solution and hydrogen peroxide solution to show a greater penetration of radioactive substances through the dentin of these teeth. It would indicate that it helped to cleanse the canal more thoroughly and to pave the way for greater penetration of the medication being used.

Gly-Oxide has certain other advantages during the preparation of the root canal. It acts as a lubricant for the instru-

ments, which is particularly useful when the instruments are to be used in the very fine canals in mature teeth. When hypochlorite material is added, the billowy type of effervescence helps to clean and brighten the tooth at the same time. It has a very fine type of bubbling, not the type observed when aqueous hydrogen peroxide is used. The aqueous type has a very rapid action, whereas the Gly-Oxide has a prolonged action, which allows time to work the material down into the canals and to initiate the flushing action with the hypochlorite, when desired. Throughout the series there was no evidence of irritation or allergic reactions produced by this chemical substance.

It was interesting to note that the type of organism, as isolated and identified, helped to check on the accuracy of the preparation of the canal. There were nine instances in which a change in the organism was found between culture no. 1 and culture no. 3. However, it should be noted that the organism may not have been a contaminant, but an organism not detected during the original culture. There were a number of instances in which mixed cultures were detected in the canal. This was particularly true if the tooth had been opened for drainage.

SUMMARY AND CONCLUSION

Seventy-seven teeth were used in this study to determine the importance of chemomechanical preparation and also to compare the effectiveness of urea peroxide in a vehicle of anhydrous glycerol with aqueous glycerol with aqueous hydrogen peroxide in the chemomechanical preparation of infected root canals. In both instances, a very high percentage of growth-free cultures were obtained after the initial cleansing and enlarging of the canal. However, on the third culture, when medication was not used in between treatments, there seemed to be a difference between the efficiency of the Gly-Oxide and the aqueous hydrogen peroxide as measured by culture technic. The urea peroxide-anhydrous glycerol appeared to be superior.

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1. Auerbach, M. B. Antibiotics vs. instrumentation in endodontics. New York State D. J. 19:225 May 1953.

2. Stewart, G. G. The importance of chemo-mechanical preparation of the root canal. Oral Surg., Oral Med. & Oral Path. 8:993 Sept. 1955.

3. Coolidge, E. D., and Kesel, R. G. A textbook of endodontology, ed. 2. Philadelphia, Lea & Febiger, 1956, p. 202.

4. Sommer, R. F.; Ostrander, F. D., and Crowley, M. C. Clinical endodontics. Philadelphia, W. B. Saunders Co., 1956, p. 147.

5. Grossman, L. Endodontic practice, ed. 5. Philadelphia, Lea & Febiger, 1960, p. 209.

6. Marshall, F. J.; Massler, M., and Dute, H. L. Effects of endodontic treatments on permeability of root dentine. Oral Surg., Oral Med. & Oral Path. 13:208 Feb. 1960.

7. The material, Gly-Oxide, used in this study was furnished by International Pharmaceutical Corporation, Philadelphia.

8. Brown, E. A. Glycerite of hydrogen peroxide: correlative review of laboratory and clinical data. Ohio State M. J. 42:600 June 1946.

9. Cobe, H. M. Investigations of a new dental chemotherapeutic agent in the presence of blood. Oral Surg., Oral Med. & Oral Path. 13:678 June 1960.

10. Cobe, H. M.; Chilton, N. W., and Kaufman, H. Evaluation of a dual culture medium for endodontics. New York State D. J. 23:371 Oct. 1957.

11. Leavitt, J. M.; Naidorf, I. J., and Shugaevsky, P. Aerobes and anaerobes in endodontics. New York State D. J. 25:377 Dec. 1955.

12. Stewart, G. G. Determination of the approximate volumes of medication used in endodontic treatment. J. D. Res. 27:24 Feb. 1948.

Bad Writing • There is no excuse for bad writing, which is generally a symptom of poor thinking. *George Sarton. Notes on the Reviewing of Learned Books. Science 131:1184 April 22, 1960.*

Relation of human abnormalities of structure and function to abnormalities of the dentition. I. Relation of hypoplasia of enamel to cerebral and ocular disorders

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To test the hypothesis that dental developmental defects may serve to identify insults that produce defects in other tissues or organ systems, 286 patients at institutions for those with mental retardation or convulsive disorders were examined. All subjects had deciduous dentitions and exhibited diagnoses other than mongolism, idiopathic epilepsy or those associated with the Rh factor. Ninety patients (31.47 per cent) exhibited hypoplasia of the enamel and 78 (27.27 per cent) had a recorded birth weight under 5½ pounds. Although both cerebral palsy and ocular fibroplasia were positively associated with hypoplasia of the enamel, cerebral palsy and ocular fibroplasia were not positively associated.

This paper reports a study of 767 individuals conducted at Lapeer State Home and Training School, Caro State Home for Epileptics and Coldwater State Home and Training School in the State of Michigan from July 1958 to February 1959. The principal hypothesis under consideration was that the study of dental developmental defects, in relation to the time of origin in the developmental process, may serve to identify insults which produce defects in other tissues or organ systems. The similarity of embryonic development and the common ectodermal origin of enamel and nervous tissue have led to a special interest in comparisons of developmental defects in these two tissues. It can be hypothesized that an abnormality will result if the insult is of sufficient magnitude and occurs at a critical period of development of a specific tissue or organ. The physiologic characteristics of enamel are such that any interference with amelogenesis remains as a permanent and observable defect.

The embryology of the dental structures has been worked out in considerable detail, and estimates now are available of the chronological sequence of the development of the teeth. Chase's[1,2] studies of the incremental pattern of deposition of enamel, Sarnat and Schour's[3] studies of "tooth ring analysis" and Logan and

Kronfeld's[4] studies of the development of human jaws and surrounding structures have provided background information for several studies which have attempted to relate developmental defects of the enamel to various prenatal and postnatal insults.

Kreshover and co-workers,[5-8] from several experiments with rats, have reported a relation between hypoplastic enamel and such insults as (1) artificially induced fever, (2) alloxan diabetes, (3) injected tubercle bacilli, (4) injected virus of vaccinia, and (5) lymphocytic choriomeningitis. The hypoplasia of the enamel observed in the rodents was reported to be microscopically and macroscopically similar to that observed in human beings. On the basis of these and other findings, Kreshover and his coworkers concluded that hypoplasia of the enamel was nonspecific in nature and could be induced by a variety of insults.

Sheldon, Bibby and Bales[9] reported a correlation between hypoplasia of the enamel (75 per cent temporal correspondence) and deficiencies of vitamin C, vitamin D and calcium or phosphorus. They noted relations with chickenpox, pneumonia, respiratory infections, postnatal intestinal obstructions, and intravenous feeding.

Sarnat and Schour[3] were able to correlate microscopic hypoplasia of the enamel with systemic disease or disturbance in less than 50 per cent of a group of 60 children. Their conclusion regarding etiology was "nonspecific severe metabolic upset." They found that rickets had the most frequent association and that the exanthematous diseases were relatively unimportant in this respect.

In 1939 Kronfeld and Schour[10] reported an instance of hypoplastic enamel in a premature infant with cerebral palsy. The hypoplasia was located in the incisal and occlusal portions of the deciduous teeth. They suggested that the occurrence of the hypoplasia in these areas of early formation did not suggest prenatal hypoplasia but a neonatal line accentuated in an early level of development by prematurity. When a molar and incisor were sectioned, the hypoplasia was found to be coincident with the neonatal line.

In 1936 Schour[11] conducted a microscopic analysis of 350 deciduous teeth chosen at random. In 90 per cent of the teeth the presence of distinctive incremental lines in the enamel and dentin was observed. The positions of these lines were reported to be indicative of the neonatal period.

In 1950 Spitzer and Mann[12] conducted a study of congenital malformations of the eyes and teeth of mentally defective patients. They recorded anomalies of the permanent dentition only. Hypoplasia of the enamel was found to be most prevalent in idiopathic epileptics and unclassified mentally deficient patients. They concluded that all the anomalies were prenatal in onset and submitted the hypothesis that all amelogenesis occurs before birth and all calcification occurs after birth.

In 1944 Evans[13] reported a study of congenital defects in infants subsequent to maternal rubella during the period of pregnancy. Of 34 infants examined, eight showed hypoplasia of the deciduous dentition. In 1947 Evans[14] was able to complete a more extensive investigation of 67 such children. There were 13 (20 per cent) instances of hypoplasia of the enamel reported. Evans assigned the initiation of all the dental anomalies to the prenatal period.

Via and Churchill[15] have reported a strong relation between hypoplasia of the enamel of the deciduous dentition and cerebral disorders in children. They found that the prevalence of hypoplasia in a group of 100 children with cerebral disorders was 68 per cent. The prevalence of hypoplasia of the enamel in 100 of their controls was observed to be 10 per cent. A total of 67 abnormal children had a history of potentially brain-damaging events. Forty-four of the 67 children

were found to have hypoplasia of the enamel. Nineteen per cent of the group experiencing cerebral disorders had hypoplasia in a portion of the tooth indicative of a prenatal disturbance. The criterion used in this study to indicate prenatal hypoplasia was "any hypoplasia occurring in the incisal four-fifths of primary central and lateral incisors."

METHOD AND MATERIALS

The criterion for admission to the homes at Lapeer and Coldwater is "mental retardation," and the criterion for admission of patients to the home at Caro is "convulsive disorder." Patients of all ages are admitted to all three homes.

At Lapeer, patients chosen for study consisted of the total population of the nursery (ages 1 to 7 years) and the total population of the cottage for female patients with mongolism (ages 6 years and over). Patients also were included from four other cottages at Lapeer. These four cottages were chosen for two reasons. First, the distribution by age of the patients indicated that contamination of the data by loss of permanent teeth through exfoliation or extraction would be at a minimum. Second, the administrators of the institution suggested that the medical diagnoses of the patients in these cottages would be reasonably representative of the diagnoses for the entire institution. At Coldwater all the children in the nursery (ages 1 to 9 years), with the exception of some patients with mongolism, were included. At Caro all patients with a diagnosis of idiopathic epilepsy were included.

Information concerning heredity, gestation and subsequent development was obtained from the institutional records. The final medical diagnosis depended on information secured from the records in conjunction with a physical examination of each patient included in the investigation. Unfortunately the records, maintained by the institutions, primarily for administrative purposes, often were inadequate for the purposes of the investigation.

The 286 individuals included for analysis in this paper are (1) patients with a deciduous dentition and (2) patients exhibiting diagnoses other than mongolism, idiopathic epilepsy or those associated with the Rh factor. Mongolism, Rh factor and idiopathic epilepsy will be reported in subsequent papers.

An examination with the aid of a flashlight, mirror and explorer was conducted for each individual. The following criteria for interpretation of the oral examination were established prior to the study:

1. Hypoplasia of the enamel was defined as any pitted or smooth horizontal indentation in the enamel detectable with mirror and explorer.
2. Hypocalcification of the enamel[16] was defined as defects of texture of the enamel detectable with mirror and explorer.
3. Hypomaturation of the enamel was defined as areas of the enamel exhibiting a snow-white color with no structural defect detectable with mirror and explorer.
4. Congenitally missing teeth was defined as any teeth missing bilaterally beyond the expected period of eruption when proper space was not evident and the tooth was not palpable in the soft tissues, or any prolonged bilateral retention of the deciduous teeth.
5. Abnormal morphology was defined as any obviously detectable deviation from Wheeler's[17] description of the anatomy of the individual teeth.
6. Cleft lip or palate was defined as any complete or partial cleft of the lip or palate.
7. High palate—palates were subjectively and dichotomously classified as either high or normal.
8. Prenatal and postnatal defects of the enamel were determined, whenever possible, by securing specimens of defective teeth which were sectioned and examined microscopically in an attempt to

Table 1 • Hypoplasia of the enamel of the deciduous dentition by weight at birth and diagnoses for patients other than those exhibiting Rh incompatibility, epilepsy or mongolism

Condition of patient	Weight at birth over 5½ pounds		Weight at birth under 5½ pounds		Total subjects
	With hypoplasia	Without hypoplasia	With hypoplasia	Without hypoplasia	
Cerebral palsy (not including premature births) assumed to be of congenital origin	16	26	0	0	42
Cerebral palsy (not including premature births) assumed to be of natal origin	6	4	0	0	10
Cerebral palsy from postnatal factors	5	13	1	1	20
Cerebral palsy in the premature group of infants not included in above	0	0	13	22	35
Developmental disorders	1	20	2	2	25
Oligophrenia and oligoencephaly*	12	58	10	6	86
Microcephaly vera	0	7	0	1	8
Ocular fibroplasia with no disorder of the motor system	0	0	13	1	14
Cranial dysostoses	0	4	0	1	5
Mental deficiency associated with natal factors, but with no disorder of the motor system	1	3	0	0	4
Mental deficiency produced by degenerative diseases	2	3	0	0	5
Hydrocephalus assumed to be of congenital origin	4	13	2	1	20
Other conditions not included in preceding	1	9	1	1	12
Totals from all groups	48	160	42	36	286

*Term originated by Benda (Benda, C. E. Developmental disorders of mentation and cerebral palsies. New York, Grune & Stratton, 1952). Oligoencephaly denotes a lack of cell differentiation as opposed to a lack of growth as noted in microcephaly, for example.

determine where the defect was situated relative to the neonatal line described by Schour.[11]

The developmental horizons of Streeter[18] and the textbooks by Arey[19] and Patten[20] were utilized in the determination of approximate time of somatic development. The investigations of Kronfeld,[21] Logan and Kronfeld,[4] and Garn and co-workers[22] were utilized as guides in the determination of the approximate time of dental development.

RESULTS

Of the 286 patients shown in Table 1, 90 (31.47 per cent) exhibited hypoplasia of the enamel and 78 (27.27 per cent) had a recorded birth weight under 5½ pounds. It is striking that among the young institutionalized patients, more than one quarter had a birth weight under 5½ pounds. It was also observed that 20 children were blind or partially blind as an end result of retrolental fibroplasia. The conditions seen were enophthalmos, microphthalmus, shallow or nonexistent anterior chambers, plus atrophic iris with synechiae and a total retrolental mass, or relatively normal anterior segment with a total or partial retrolental fibrotic mass. For the purposes of this paper these conditions will be designated as ocular fibroplasia, but only when they are not associated with defects of other organ systems thought to be of

Table 2 • Distribution of children with weight at birth under 5½ pounds by presence or absence of hypoplasia of the enamel and by neurologic and ocular diagnoses

	With ocular fibroplasia		Without ocular fibroplasia		Total
	With cerebral palsy	Without cerebral palsy	With cerebral palsy	Without cerebral palsy	
With hypoplasia of the enamel*	3 $\bar{X}$ = 3.687	13 $\bar{X}$ = 3.338	11 $\bar{X}$ = 4.094	15 $\bar{X}$ = 4.683	42 $\bar{X}$ = 4.045
Without hypoplasia of the enamel	3 $\bar{X}$ = 2.729	1 $\bar{X}$ = 1.875	20 $\bar{X}$ = 4.183	12 $\bar{X}$ = 4.635	36 $\bar{X}$ = 4.148
Total	6 $\bar{X}$ = 3.208	14 $\bar{X}$ = 3.216	31 $\bar{X}$ = 4.151	27 $\bar{X}$ = 4.638	78 $\bar{X}$ = 4.095

*$\bar{X}$ = the arithmetic mean of weight at birth in pounds.

prenatal origin. No attempt was made to include any of the lesser degrees of retrolental fibroplasia.

Table 1 presents the distribution of hypoplasia of the enamel among the children studied by weight at birth. It shows that 53.85 per cent of the children having weights at birth of 5½ pounds or under, exhibited hypoplasia of the enamel, whereas 23.08 per cent of children having weights at birth of 5½ pounds or over, exhibited a similar condition. It is evident that a few children may fall into several diagnostic categories. However, only the condition that was considered primary was designated. If a child manifested a developmental disorder, he was classified under this category even when coexistent cerebral palsy was observed. Children with incomplete or unsuitable dentitions were not included. The designation of cerebral palsy included all degrees of spastic paralysis. Most of the children with cerebral palsy were quadriplegic, although there were occasional instances of paraplegia or hemiplegia. Obviously the quadriplegic is the most severely handicapped of the cerebral palsied children, and, therefore, most likely would be institutionalized. Disorders of movement, dyskinesia or ataxia without other signs were not designated as cerebral palsy. A careful evaluation of the history was made in order to implicate any natal or postnatal factors that might cause the cerebral palsy. If no such factor could be inferred, the condition was designated as congenital in origin.

The distribution of hypoplasia of the enamel accompanying neurologic and ocular diagnoses for children with weights under 5½ pounds at birth is shown in Table 2. There were no abnormal siblings in the group of 78 children. Six children were of multiple birth, and two of them had ocular fibroplasia. Of these 78 children, 13 had weights at birth of 5 to 5½ pounds; six of them experienced hypoplasia. Eliminating the multiple births and choosing a level of maximum weight at birth of 5 instead of 5½ pounds would not have changed the results significantly. The average weight at birth was cited for each category, and a partitioned chi-square test was utilized to determine the relationships among the various diagnostic groups. The results of these tests have been submitted in Table 3. They indicate that ocular fibroplasia and cerebral palsy are not positively associated, but that ocular fibroplasia and hypoplasia of the enamel are positively associated, as are cerebral palsy and hypoplasia of the enamel.

DISCUSSION

All linear hypoplasia of the enamel observed in the deciduous dentition of the population studied has been interpreted

as neonatal hypoplasia. This decision was made after microscopic examination of 40 hypoplastic teeth from children included in the study. In each instance the hypoplastic lesion was found to be coincident with the neonatal line regardless of the gingivo-incisal position of the defect (Fig. 1-3).

A chi-square analysis of the position of linear hypoplastic lesions and weight at birth also was made for 50 children exhibiting hypoplasia of the enamel. The results of this analysis indicated that as the weight at birth decreases, the shift of the lesions was toward the incisal third. Such findings are in agreement with the hypothesis of Kronfeld and Schour[10] which suggests that prematurity will result in a shifting of the neonatal line to an earlier (more incisal) position of formation of the enamel. Hence, it is not feasible to decide whether or not an interruption in amelogenesis is prenatal, neonatal or postnatal on the basis of its gingivo-incisal position alone. Some method of determining the degree of somatic development also is required. Disturbances in amelogenesis, which were interpreted as prenatal, affected the enamel in a general rather than a linear fashion (Fig. 4-6). Such disturbances are probably indicative of a chronic insult operative throughout the period of gestation.

The observance of a high rate of linear hypoplastic lesions of the deciduous dentitions of these children is suggestive of two etiological possibilities which are not necessarily mutually exclusive. First, the hypoplasia of the enamel may be caused by some type of insult at birth and may be associated with other somatic defects originating at birth. Such a mechanism

Fig. 1 • Photomicrograph of linear hypoplastic lesion of labial surface. Note that hypoplastic defect is coincident with only line that can be interpreted as a neonatal line. Cells most affected appear to be those at a high point of differentiation just prior to amelogenesis

Table 3 • Partitioned chi-square test of the relationships among ocular fibroplasia, hypoplasia of the enamel, and cerebral palsy

Diagnostic categories		df	Decision (alpha equals .01)
Ocular fibroplasia with hypoplasia	7.403	1	Significant
Ocular fibroplasia with cerebral palsy	3.279	1	Not significant
Hypoplasia with cerebral palsy	7.258	1	Significant
Ocular fibroplasia with hypoplasia with cerebral palsy	1.555	1	Not significant
Total	19.484	4	Highly significant
For entire group			
Proportion with hypoplasia			54%
For those exhibiting ocular fibroplasia			
Proportion with hypoplasia			80%
For those having cerebral palsy			
Proportion with hypoplasia			38%
Proportion with ocular fibroplasia having hypoplasia			50%
For those not exhibiting cerebral palsy			
Proportion with hypoplasia			68%
Proportion with ocular fibroplasia having hypoplasia			93%

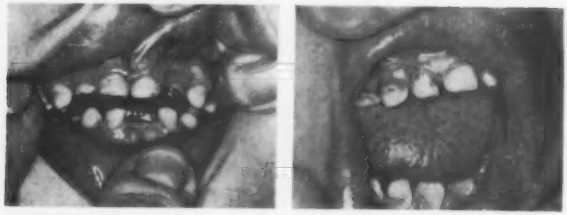

Fig. 2 • Left: Case 1. Hypoplastic lesions in incisal region of maxillary central and lateral incisors. Weight at birth was 2 pounds, 2 ounces. Child had spastic paraplegia

Right: Case 2 • Pitted, hypoplastic lesions in gingival region of anterior teeth. Weight at birth was 5 pounds, 4 ounces. Mother was reported to have had poliomyelitis during pregnancy. Child had oligoencephaly and retrolental fibroplasia

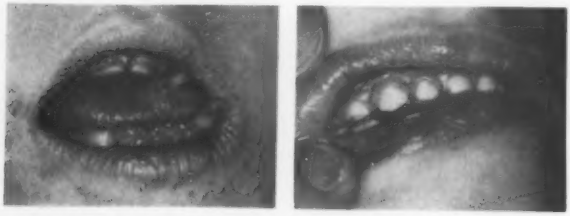

Fig. 3 • Left: Case 3. Hypoplastic lesions in middle third of maxillary and mandibular central incisors. Child also had high palate. Weight at birth, 3 pounds, 4 ounces. Child had ocular fibroplasia, natal cerebral palsy and hyaline membrane. Hemorrhage during gestational period was reported; mother has since given birth prematurely to a son after hospitalization for hemorrhage

Right: Case 4 • Hypoplastic lesions of occlusal third of all four first molars. Weight at birth, 4 pounds, 3 ounces. Child had ocular fibroplasia, cerebral palsy, with spastic quadriplegia and cataract of right lens

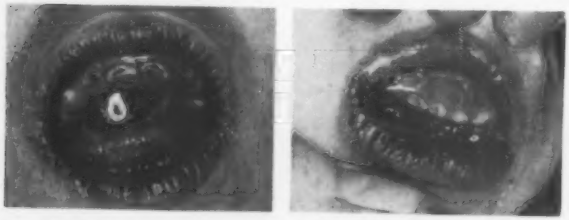

Fig. 4 • Left: Case 5. Generalized defective prenatal enamel. Birth had been at full term, but other prenatal, natal and postnatal histories were inadequate. Child had degenerative or metabolic disorder

Right: Case 6 • Hypomaturation and hypocalcification of complete labial surfaces of incisors. Child had cleft lip, cleft palate, microcephaly and spastic quadriplegia. Weight at birth, 4 pounds, 4 ounces

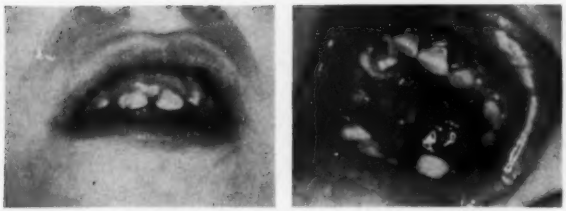

Fig. 5 • Left: Case 7. Hypomaturation with some disintegration of enamel of incisal half of maxillary central incisors; possibility of congenital absence of maxillary lateral incisors. Weight at birth was undetermined. Mother suffered from a heart condition and received digitalis throughout gestational period; birth was complicated by congestive heart failure of mother. Child had microcephaly and spastic quadriplegia

Right: Case 8 • Generalized defective enamel. Birth was at full term; other prenatal, natal and postnatal histories were inadequate. Child had degenerative or metabolic disorder

would be in agreement with early hypotheses of the role of neonatal hypoxia in cerebral palsy. Second, these patients, for some reason, may be more susceptible to insult at birth and the accentuated neonatal line in the enamel and the premature birth may be events secondary to some earlier primary factor responsible for the associated somatic damage. If the second hypothesis is true, it may explain why Evans[14] observed hypoplasia of the enamel of children of mothers who had contracted rubella in the first six weeks of gestation which would be prior to the deposition of enamel. Evans suggested, however, that the persistence of viruses in tissues for long periods after the disease probably explained the etiology.

Fig. 6 • Case 9. Hypomaturation of incisal and middle third of enamel of maxillary central and lateral incisors. Weight at birth was undetermined. If this child experienced a full-term gestational period, dental defects may be designated as prenatal. Child had oligoencephaly

It is of interest to note a difference in the pattern of hypoplasia in the group just reported when compared with the diagnostic group resulting from Rh incompatibility to be reported later. In this latter group a complete hypoplastic groove around the tooth consistently was observed. In the group analyzed in this paper the hypoplasia of the enamel affected only the labial or buccal surfaces or both. Since the labial portions of the developing tooth are supplied by the more terminal areas of the capillary beds and since these areas are also under pressure of eruption not experienced by the lingual portions, it seems reasonable to assume that these defects are caused by a deficiency of some essential metabolite rather than by an excess. Such findings may not be in complete agreement with the hypothesis that suggests that retrolental fibroplasia is the result of a period of exposure to an excess of oxygen as reported by Kinsey[28] and others. However, the possibility exists that the hypoplasia of the enamel is caused by the original insufficiency of oxygen, and the eye conditions by the subsequent increase in oxygen tension in the incubator. It also is possible that both the retrolental fibro-

plasia and enamel hypoplasia are caused by a deficiency in some essential metabolite produced indirectly by a prolonged excess of oxygen.

For the population studied, consisting of subjects whose weight at birth was less than 5½ pounds, an association of hypoplasia of the enamel and ocular fibroplasia is hypothesized. It is possible that mental deficiency also may be significantly associated with these two conditions. Whether the mental deficiency present can be explained by prematurity rather than a direct association with retrolental fibroplasia is unsettled. The results of Kerr and Scott,[24] Krause,[25] and Williams,[26] indicate a much higher percentage of mental defect in children experiencing retrolental fibroplasia when compared with normal children. Kerr and Scott stated that if anoxia does play a fundamental role, it would seem illogical that the eye alone always should be the site of the attack. The observations of this investigation agree with their statement. However, because the population studied in this investigation was selective for mental deficiency, it cannot be hypothesized that cerebral involvement is part of the disease.

Krause[27] suggested a condition that he called congenital encephalo-ophthalmic dysplasia in which ocular dysplasia was associated with dysplasia of the brain. Ingalls[28] suggested that antenatal anoxia, resulting from an abnormal placental environment that was associated with multiple pregnancy, placental disease and hemorrhage or toxemia of pregnancy, may be an important causative factor in encephalo-ophthalmic dysplasia. The study reported here indicates, however, that the syndrome presented by Krause is erroneous in some respects, inasmuch as none of the hydrocephalic patients examined at the three institutions manifested any signs of ocular dysplasia. Hydrocephaly occurred in 4 of the 18 persons described by Krause. Reese and Blodi[29] also point out that Krause evidently was referring to retrolental fibroplasia as well as retinal dysplasia. Retrolental fibroplasia is associated with prematurity whereas retinal dysplasia is a bilateral congenital malformation manifesting itself at birth in full-term infants in association with cerebral agenesis and congenital abnormalities elsewhere in the body. Probably the conditions in the patients described by Krause do not constitute a single syndrome.

The average weight at birth in the group of children reported in this paper who experienced ocular fibroplasia was 3.4 pounds. Most of the children in this group (13 of 16 children) may have had borderline or minor neurologic disorders, but nothing that would be classified as cerebral palsy. It was believed that these children did not suffer from cerebral malformations, although they were mentally deficient. It may be expected that the blind premature child who is institutionalized often will become mentally retarded. In children whose weights at birth are over 5½ pounds there will be a high degree of association between hypoplasia of the enamel and cerebral palsy. None of these children whose births were full term showed any evidence of ocular fibroplasia.

An explanation of Szewczyk[30] seems compatible with the findings of this study. Szewczyk postulates that when the child reaches the fetal age of nine months, the requirements for oxygen in certain centers of the brain may rise and may approach or exceed that of the retina in utilization of oxygen. If the retina has passed its critical stage of development at full term, and if certain cerebral centers then are in a critical stage of development and high in their requirement for oxygen, a hypoxic insult at or about the time of delivery could produce serious damage in specific neural centers without producing ocular fibroplasia, or if the hypoxia were sufficiently severe, both could be produced. The production of cerebral palsy or similar conditions with

or without ocular fibroplasia then could be explained. An association between retrolental fibroplasia and cerebral palsy has been noted by Ingram and Kerr.[31] Six of their 21 patients experiencing retrolental fibroplasia had cerebral diplegia. Although the criteria of diagnosis of retrolental fibroplasia and cerebral palsy may have differed somewhat in the studies cited, the general pattern of insult does seem to conform to Szewczyk's hypothesis.

The nutritional requirements of the developing tooth bud presumably remain constant or near constant throughout development; hence, one can understand the association of hypoplasia of the enamel with ocular fibroplasia in premature infants and with cerebral palsy in infants having weights at birth over 5½ pounds. The presence or absence of linear hypoplasia of the enamel of the deciduous dentition may indicate whether or not physiologic trauma at birth has caused or contributed to the neurologic or ophthalmological condition of the child. The presence or absence of a generalized type of prenatal hypoplasia may serve as an indication of an abnormality in the prenatal environment.

SUMMARY

Two hundred and eighty-six patients at institutions whose criteria for admission were "mental retardation" or "convulsive disorder" were studied. The principal hypothesis under consideration was that dental developmental defects, in relation to the time of origin in the developmental process, may serve to identify insults which produce defects in other tissues or organ systems. The 286 subjects included for analysis were (1) patients with a deciduous dentition and (2) patients exhibiting diagnoses other than mongolism, idiopathic epilepsy or those associated with the Rh factor.

Of the 286 patients, 90 (31.47 per cent) exhibited hypoplasia of the enamel and 78 (27.27 per cent) had a recorded birth weight under 5½ pounds.

Both cerebral palsy and ocular fibroplasia were positively associated with hypoplasia of the enamel. However, cerebral palsy and ocular fibroplasia were not positively associated.

All linear hypoplasia of the enamel observed in the deciduous dentition was interpreted as neonatal hypoplasia regardless of its cervico-incisal position which varied with birth weight.

Prenatal hypoplasia was observed to be of a general rather than a linear pattern.

The labial and buccal location of the linear hypoplasia suggested a deficiency of some essential metabolite. *Box 8*

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1. Chase, S. W. Nature of the enamel matrix at different ages. J.A.D.A. 22:1343 Aug. 1935.

2. Chase, S. W. Development, histology, and physiology of enamel and dentin—their significance to the caries process. J. D. Res. 27:87 Feb. 1948.

3. Sarnat, B. G., and Schour, Isaac. Enamel hypoplasia (chronologic enamel aplasia) in relation to systemic disease: a chronologic, morphologic and etiologic classification. J.A.D.A. 28:1989 Dec. 1941; 29:67 Jan. 1942.

4. Logan, W. H. G., and Kronfeld, Rudolf. Development of the human jaws and surrounding structures from birth to the age of fifteen years. J.A.D.A. 20:379 March 1933.

5. Kreshover, S. J. Pathogenesis of enamel hypoplasia: an experimental study. J. D. Res. 23:231 Aug. 1944.

6. Kreshover, S. J.; Clough, O. W., and Bear, D. M. Prenatal influences on tooth development. I. Alloxan diabetes in rats. J. D. Res. 32:246 April 1953.

7. Kreshover, S. J.; Clough, O. W., and Hancock, J. A. Vaccinia infection in pregnant rabbits and its effect on maternal and fetal dental tissues. J.A.D.A. 49:549 Nov. 1954.

8. Kreshover, S. J., and Hancock, J. A., Jr. Effect of lymphocytic choriomeningitis on pregnancy and dental tissues in mice. J. D. Res. 35:467 June 1956.

9. Sheldon, Marvin; Bibby, B. G., and Bales, M. S. Relationship between microscopic enamel defects and infantile debilities. J. D. Res. 24:109 April 1945.

10. Kronfeld, Rudolf, and Schour, Isaac. Neonatal dental hypoplasia. J.A.D.A. 26:18 Jan. 1939.

11. Schour, Isaac. Neonatal line in the enamel and dentin of the human deciduous teeth and first permanent molar. J.A.D.A. 23:1946 Oct. 1936.

12. Spitzer, Richard, and Mann, Ida. Congenital malformations in the teeth and eyes in mental defectives. J. Ment. Sc. 96:681 July 1950.

13. Evans, M. W. Congenital dental defects in infants subsequent to maternal rubella during pregnancy. M. J. Australia 2:225 Sept. 2, 1944.

14. Evans, M. W. Further observations on dental defects in infants subsequent to maternal rubella during pregnancy. M. J. Australia 1:780 June 28, 1947.

15. Via, W. F., Jr., and Churchill, J. A. Relationship of cerebral disorder to faults in the dental enamel. A.M.A. J. Dis. Child. 94:137 Aug. 1957.

16. Hals, Einar. Hypocalcification of the enamel. Acta odont. scandinav. 15:177 Aug. 1957.

17. Wheeler, R. C. Textbook of dental anatomy and physiology. Philadelphia, W. B. Saunders Co., 1940.

18. Streeter, G. L. Developmental horizons in human embryos; age groups XI to XXIII. Collected papers from the Contributions to Embryology, Embryology reprint, vol. 2. Washington, D. C., Carnegie Institution of Washington, 1951.

19. Arey, B. L. Developmental anatomy; a textbook and laboratory manual of embryology, ed. 5. Philadelphia, W. B. Saunders Co., 1946.

20. Patten, B. M. Human embryology. Philadelphia, The Blakiston Co., 1946.

21. Kronfeld, Rudolf. Development and calcification of the human deciduous and permanent dentition. Bur 35:18 March 1935.

22. Garn, S. M.; Lewis, A. B., and Polacheck, D. L. Variability of tooth formation. J. D. Res. 38:135 Jan.-Feb. 1959.

23. Kinsey, V. E. Retrolental fibroplasia; cooperative study of retrolental fibroplasia and the use of oxygen. A.M.A. Arch. Ophth. 56:481 Oct. 1956.

24. Kerr, J. D., and Scott, G. I. Retinopathy of prematurity. Arch. Dis. Childhood 29:543 Dec. 1954.

25. Krause, A. C. Effect of retrolental fibroplasia in children. A.M.A. Arch. Ophth. 53:522 April 1955.

26. Williams, C. E. Retrolentale Fibroplasie in Verbindung mit Geistesstörungen. Zschr. ärztl. Fortbild. 51:926 Nov. 15, 1957.

27. Krause, A. C. Congenital encephalo-ophthalmic dysplasia. Arch. Ophth. 36:387 Oct. 1946.

28. Ingalls, T. H. Epidemiology of encephalo-ophthalmic dysplasia. J.A.M.A. 138:261 Sept. 25, 1948.

29. Reese, A. B., and Blodi, F. C. Retinal dysplasia. Am. J. Ophth. 33:23 Jan. 1950.

30. Szewczyk, T. S. Retrolental fibroplasia and related ocular diseases; classification, etiology, and prophylaxis. Am. J. Ophth. 36:1336 Oct. 1953.

31. Ingram, T. T. S., and Kerr, J. D. Association of retrolental fibroplasia with cerebral diplegia. Arch. Dis. Childhood 29:282 Aug. 1954.

An evaluation of periodontal splinting

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Tooth mobility usually is the result of occlusal trauma associated with periodontal disease. Part of the treatment may be splinting, which protects weak teeth from lateral stress. Factors involved in the design of temporary and permanent splints, and the advantages and disadvantages of available materials, are discussed.

Tooth mobility is usually the result of occlusal trauma associated with the inflammatory processes of periodontal disease. A malrelationship of clinical crown to root may also be present. After complete periodontal therapy, when mobility of the teeth is due to poor relationship between the supporting bone and the clinical crown length and in instances where this cannot be corrected by occlusal grinding, permanent splinting is usually the best therapy. When adequate alveolar bone is present the prognosis is often favorable. In either instance, however, temporary splinting may be indicated until periodontal therapy has been completed and the condition re-evaluated.

OBJECTIVES OF TEMPORARY SPLINTING

Adjunct to Periodontal Therapy • Temporary splinting prevents continued pathological movement which in itself is an etiologic factor in periodontal disease. Excessive tooth movement can cause destructive compression of some periodontal fibers and tearing of others. When the

clinical crown-to-root ratio is unfavorable because of the lever arm distance, the mechanical advantage of the force application may exceed the physiologic capacity of the periodontal fibers to resist. The periodontal fibers are then crushed against the alveolar crest on one side of the tooth and torn at the other.

A splint supports the teeth so that interceptive contacts can be readily located and eliminated by occlusal adjustment. When the teeth are excessively mobile it is difficult to locate the specific interceptive contacts. Rather than register an interceptive contact, the offending tooth will move in the periodontal housing and make diagnosis difficult. On the other hand, when the teeth are splinted, the offending contact can be easily located by wax bite, percussion, and articulating paper.

The resultant stability and distribution of occlusal pressure provide the best possible environment for successful periodontal therapy. Histological evidence indicates that occlusal trauma, when coupled with local irritational or systemic factors, or both, is an etiologic agent in periodontal disease.[1,2]

Since periodontal treatment is aimed at removing as many etiologic factors as possible, the elimination of occlusal trauma is often a logical starting phase. Calculus removal and pocket elimination will then produce the best possible tissue response in an environment that is devoid of continual traumatic injury.

Temporary Splinting as a Therapeutic Trial • Frequently, bone loss has taken place as a result of soft tissue involvement which results in considerable mobility and the prognosis for complete tightening may be questionable. In these instances the temporary splint may be maintained for six months after the completion of soft tissue therapy. If the teeth remain mobile after the therapeutic trial, permanent splinting must be instituted. In the borderline conditions it should be determined if the teeth will tighten without resorting to permanent splinting. It is important to check for occlusal interceptive contacts when the splint is applied as well as after it is removed.

Temporary Splinting as a Preliminary to Permanent Restorations • When inadequate periodontal support is evident, temporary splinting may be used to help stabilize the arch during periodontal therapy and as an aid to tissue maintenance during the actual reconstruction. In most instances the choice of material and the method of temporary splinting should be planned according to the length of time the splint is to remain in the mouth (Table).

Table • Time classification for temporary splints

20 minutes plus	1 month to 6 months	6 months or more
Compound core	Wire	Freidman type open-end casting
Floss, silk	Wire and acrylic painted	
	Removable wire and processed acrylic. (Sorrin)	Removable continuous clasp splint
	Orthodontic bands	Fixed multiple unit splint
	Acrylic temporary crown splint or nonprecious cast splint	
	Internal splint (Obin, Arvins)	
	Acrylic bite guards, Hawley retainer	

BIOMECHANICAL RATIONALE FOR SPLINTING

Direction of Mobility • Natural teeth are more often mobile buccolingually rather than mesiodistally. Proximal contacts of the teeth help protect them from mesiodistal trauma.

Clenching or bruxism produces great lateral stress on the teeth. Vertical force on a cusp incline produces a resultant force which is perpendicular to that incline. Clenching or bruxism usually produces buccal torque on the upper working side and lingual torque on the lower. The direction of the resultant torque is reversed on the balancing side. Bilateral bruxism, then, produces a rocking motion, buccolingually, on the affected posterior teeth. Interceptive contacts on the balancing side often are the most harmful because the resultant line of force falls at the greatest distance from the alveolar bone support of the tooth.[3]

Since many patients with mobility exhibit signs of bruxism, interceptive contacts in centric occlusion and all excursions should be removed by occlusal equilibration.[4-9]

The function of a splint, for the most part, is to stabilize the teeth against lateral forces. When many teeth are missing, the problem of mesiodistal forces becomes more evident. Continuous interproximal contacts distribute mesiodistal forces throughout the arch. When one or more teeth are missing this natural advantage is lost, resulting in excessive mesial and distal stress on some of the remaining teeth.

Relatively Unequal Lateral Mobility • If a few teeth of a quadrant are relatively more mobile than the rest, splinting the mobile teeth to the firm teeth will produce stability. If the mobile tooth is located in the posterior terminal position, extended anterior splinting usually is required, preferably around the curve of the arch. When lateral force is applied near the weak posterior terminal abutment, a great deal of lateral movement will be necessary before the periodontal fibers of the abutment tooth can resist. Although splinting a weak tooth to firm anterior teeth reduces its lateral movement, the cantilever action of the splint exerts a certain amount of lateral force on the abutment teeth. The degree of this force may exceed the physiologic tolerance of the anchor teeth. To counteract the lateral force, splinting around the arch shifts the center of rotation of the whole unit toward the lingual. This change of location of the center of rotation helps resist lateral torque.

Relatively Equal Lateral Mobility • When a whole quadrant has relatively equal, but excessive mobility buccolingually, the splinting of these teeth alone will not provide enough protection from lateral forces to resist lateral movement. In a straight line splint the center of rotation passes through or near the apical third of the teeth. Lateral tipping can occur more readily in this instance. Splinting around the arch, to the opposite side, will produce stability. The tilting of one side will be resisted by the lack of vertical movement on the opposite side. Vertical compression or tension in the long axis of the tooth is more easily resisted by the periodontal fibers than lateral force. The net result is that the resistance to vertical compression or tension of the opposite side effectively combats lateral tilting on the side of the original force application.

Multiple splinting around the arch changes the location of the center of rotation. As the splinting extends around the curve in the arch, the center of rotation passes lingually and may be greater on one side than the other. Thus, the splinting of equally mobile teeth around the curvature of the arch effectively protects the teeth from lateral torque. The general direction of the resultant forces to the teeth during working movements usually is buccal on the upper and lingual

on the lower. Balancing contacts tend to produce the opposite direction of force.

A simple explanation of lateral stress may clarify this point. The clinical tilting of an individual tooth is in reality a rotation about a center of rotation near the apical third. If an occlusal force passes through this center of rotation no lateral torque, or tendency to rotate, will be produced. The expressions lateral torque, lateral stress, and lateral tilting are synonymous.

If the line of force (direction of force) falls at some distance from the center of rotation of the tooth, lateral stress or torque is produced. When many teeth are splinted in a curved arch, the whole restoration has a center of rotation that usually passes lingually from one side to the other. It is often near the apical third of the terminal abutments.

Torque is produced if a resultant force passes at some distance from the center of rotation of the whole restoration. The mechanism of this reaction is similar to that in a single tooth except that the center of rotation of a curved arch splint is in a different location.

Since the center of rotation of a multiple arch splint passes lingually from one side to the other, buccal forces on the upper restoration pass at a greater distance from its center of rotation. This produces more lateral stress than the lingual forces on the lower splint which pass toward the center of rotation (Fig. 1).

OCCLUSAL IMPACT AREA

An important topic usually neglected in a discussion of splinting, is the occlusal impact area. A vertical force on an inclined plane produces a resultant force that is perpendicular to that incline. Only in a true cusp to fossa relationship is the direction of force essentially vertical. Many dentists erroneously believe that centric occlusion produces a truly vertical force. Since the condyles are higher than the occlusal plane, mandibular closure has a mesial component. Axial inclination, and the cuspal impact area in centric occlusion, usually produce lateral resultant forces rather than purely vertical ones.[10]

FORCE ANALYSIS

A force analysis must be made in order to insure the proper design of the temporary splint and, when required, the permanent restoration.[8] That is, the axial inclination of the teeth should be related to the root anatomy, the clinical crown-to-root ratio and the type of arch form. Tooth mobility per se is evaluated by comparing the relative tooth mobility with the alveolar bone height present and the types of opposing arch forces. These forces differ, depending on whether they are produced by a complete or a partial denture, natural dentition, or a splint. Greater lateral force usually is produced, even in centric occlusion, if the occlusal impact areas have deep cuspal inclinations.

The patient's muscle physiology and occlusal habits also must be taken into consideration. It should be emphasized that lateral torque distributed to the maxillary and mandibular arches is seldom equal.

TIME AS A FACTOR IN THE METHOD USED

Splinting may be divided into groups depending on the time the splint must remain in the mouth. The table gives a time classification for various temporary splints.

20 Minutes Plus • The compound core can be used as a temporary means of stabilization. Its chief use may be to stabilize a single tooth for occlusal grinding in order to relieve pericemental pain.

Floss, grassline, or silk may be used for slightly longer periods of time to

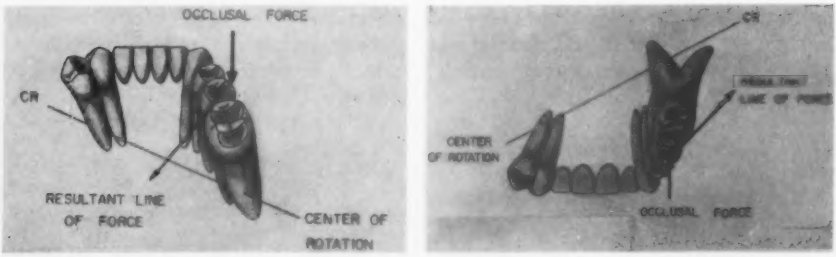

Fig. 1 • Left: In a mandibular curved arch splint, occlusal force on the buccal slope of a posterior tooth produces a lingual resultant of force. This resultant may pass through or near the center of rotation, causing little or no torque. Right: In a maxillary curved arch splint of similar design, the center of rotation usually passes near the apical third of the terminal abutments. Occlusal force on the upper buccal cusp incline produces a resultant line of force which is buccal in direction whereas the center of rotation is lingual to the tooth. This results in a great deal of torque

afford stability to teeth during other short procedures such as occlusal equilibration and surgical procedures.

One Month to Six Months • Temporary splints of a more permanent nature are sometimes indicated, particularly during prolonged periodontal therapy.

Removable Wire and Self-Curing Acrylic, Resin and Wire • Simple circumferential wire may be used for a more prolonged period of time. Because the wire splint has a tendency to loosen within two weeks, the duration of its effectiveness can be increased to six months by using a self-curing acrylic resin reinforcement.

The acrylic resin improves esthetics (Fig. 2, A). However, the wire and acrylic splints should not remain in place over too long a period of time without replacement as mottling and decay may occur beneath the splint.

Orthodontic Bands • The anatomy of the anterior teeth permits good wire ligation. For better stabilization of the posterior teeth and, in many instances on the anterior teeth, the use of welded stainless steel orthodontic bands is indicated. The bands are firm, can be made easily, and once cemented to the teeth they offer a firm splint which can easily be kept clean. If the bands are perforated before cementation they can be covered with an acrylic material and are acceptable esthetically. They are not bulky and do not interfere with toothbrush stimulation.

Internal Splints • The fixed internal temporary splint may be constructed as two approximating Class II amalgam preparations.[11] A wire may be inserted for reinforcement and then filled with amalgam or self-curing acrylic resin. It is esthetic and rigid (Fig. 2, B).

Acrylic Temporary Crown Splint • Acrylic temporary crown splints and nonprecious metal cast splints may be constructed. In both types the teeth are "rough prepared" and the crowns constructed as one unit (Fig. 2, C). These splints temporarily bind the teeth together. Usually, permanent splinting is done later and requires the careful finishing of the "rough prepared" teeth.

Acrylic "Bite Guard" Splint • The bite guard is a simple temporary appliance. It covers the occlusal surfaces of the teeth of one or, occasionally, both jaws, depending on where the mobility exists (Fig. 2, D).

Where no great mobility exists, a bite

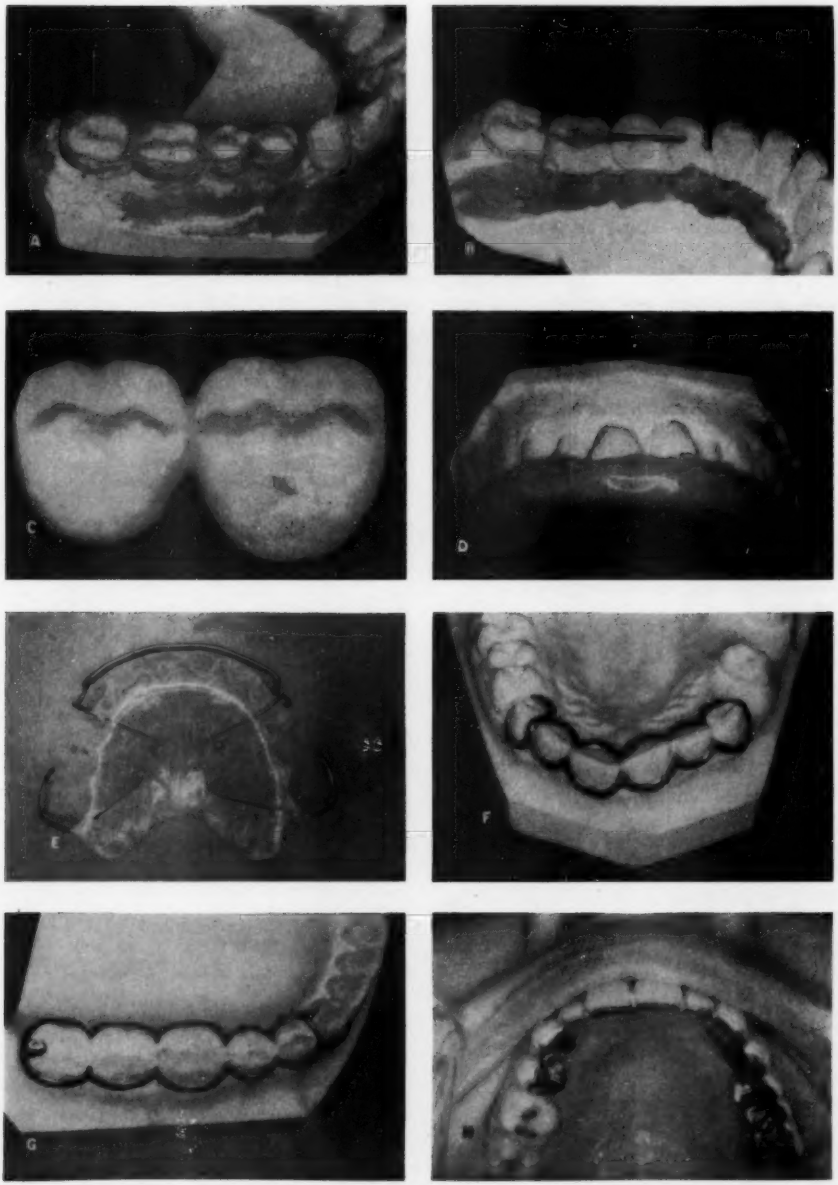

Fig. 2 • A: Processed-wire and acrylic. B: Internal splints. C: Acrylic temporary crown. D: Acrylic bite guard. E: Hawley-type appliance. F: Removable continuous clasp. G: Open continuous clasp. H: Fixed multiple units

guard can be used to stabilize teeth temporarily. It is also used to offset some of the harmful effects of the clenching and grinding habit. This type of splint should be considered a crutch and avoided wherever possible.

The Hawley type appliance (bite plate) with the flat occlusal plane (Fig. 2, E) can also be used as a temporary retainer.

Six Months or More • In considering permanent splints the prognosis of the remaining teeth should be evaluated before the splint is constructed.

Removable and Continuous Clasp Splint • A removable continuous clasp splint may be constructed in cobalt-chrome or gold.[12] It can be of considerable value when constructed as an integral part of a removable prosthetic appliance when permanent splinting is not feasible (Fig. 2, F).

Open and Continuous Clasp Splint • The open and continuous clasp splint may be used to stabilize either the anterior or posterior segment. A whole arch may be splinted in this fashion.[13] It is made in the form of a continuous clasp, closed at the distal aspect of the molars and open at the anterior aspect. An occlusal rest prevents its cervical displacement. Two proximating holes are made anteriorly to facilitate an interdental wire tie (Fig. 2, G). The appliance may be cemented into place.

Fixed Multiple Unit Splint • The multiple full or three-quarter crown coverage (Fig. 2, H) offers the best stabilization and the opportunity of occlusal reshaping in relation to patterns of force, stress, form and function.

COMMENT

The main objective of splinting is to provide a means of protecting weak teeth from lateral stress. This can be accomplished only if the interrelationship of all the factors discussed is understood and then utilized in the design of the temporary or permanent splint so that the splint can best resist the forces brought to bear on it. The choice of materials and the methods used should be related to the purpose and the duration of the time for which the splint is to be applied.

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1. Stahl, S. S.; Miller, S. C., and Goldsmith, E. D. The influence of occlusal trauma and protein deprivation on the response of periapical tissues following pulpal exposure in rats. Oral Surg., Oral Med. & Oral Path. 11:536 May 1958.

2. Stahl, S. S.; Miller, S. C., and Goldsmith, E. D. The effects of vertical occlusal trauma on the periodontium of protein deprived young adult rats. J. Periodont. 28:87 April 1957.

3. Weinberg, L. A. Force distribution in mastication, clenching and bruxism. D. Digest 63:58 Part I Feb.; 116 Part II March 1957.

4. Blass, J. L. Occlusal equilibration in periodontal treatment. New York D. J. 22:121 March 1956.

5. Box, H. K. Traumatic occlusion and traumatogenic occlusion. Oral Health 20:642 Dec. 1930.

6. Miller, S. C. Textbook of periodontia, ed 3. Philadelphia, The Blakiston Co., 1950, p. 343-384, 464-465.

7. Sorrin, S. Traumatic occlusion: its detection and correction. D. Digest 40:170 May; 202 June 1934.

8. Schuyler, C. The correction of occlusal disharmony of the natural dentition. New York D. J. 13:445 Oct. 1947.

9. Simring, M. Occlusal equilibration of the dentition. J.A.D.A. 56:643 May 1958.

10. Weinberg, L. A. Axial inclination and cuspal articulation in relation to force distribution. J. Pros. Den. 7:804 Nov. 1957.

11. Obin, J. N., and Arvins, A. N. The use of self-curing resin splints for the temporary stabilization of mobile teeth due to periodontal involvement. J.A.D.A. 42:320 March 1951.

12. Simring, M. Splinting: theory and practice. J.A.D.A. 45:402 Oct. 1952.

13. Sorrin, S. Use of fixed and removable splints in the practice of periodontia. Am. J. Orthodont. & Oral Surg. 31: (Oral Surg. Sect.) 354 June 1945.

Hinge-axes: intercondylar versus intrafossal

*Mid-States Odonto-Occlusal Symposium**

The author asserts that there is no single, intercondylar transverse axis common to and passing through both condyles, and that articulation methods based on the assumption of such a single transverse axis usually will lead to poor results. Only the Transograph articulator duplicates essential jaw function accurately, according to this symposium.

An operation succeeds or fails for one of two reasons; either the premises are or are not sound or else procedures are or are not logical. When premises are unsound, no procedure can be successful. Even though premises are sound, illogical procedures will still result if they are based on incorrect interpretations of those premises; something that renders apparently sound procedures only partially effective. Faulty interpretation may make procedures totally worthless, and it is too bad that this does not happen more often. Total failure gets action whereas partially successful results are beguiling mirages that delay action. Articulation procedures, right now, are beset by every combination of these hindrances. This paper will confine itself to one most unfortunate example and offer a remedy.

THE INTERCONDYLAR AXIS

Every articulation method but one (Transographics) assumes that there is a single, intercondylar transverse axis common to and passing through both condyles. This is a typical example of a sound premise (the hinge-axis) being incorrectly interpreted and applied. Unfortunately, procedures are partially successful, being sometimes fair or even good. When they are poor or even bad, which is equally common, the operator's belief in the intercondylar axis shunts corrective efforts away from recognizing it as the real error while impressions, waxing, castings or other auxiliary procedures are suspected and usually blamed, albeit unjustly.

If the subject's transverse axis in his right temporomandibular joint is close to symmetry with the transverse axis in his left temporomandibular joint, results with an intercondylar axis can be fair to good. Naturally, the closer the transverse axes in both joints approach confluence into a single line, the greater the chances for success with a single, intercondylar axis. When these two axes are in varying degrees of gross asymmetry, results are generally poor to bad. Because anything approaching instantaneous success in major dental articulating operations is rare, the resulting excitement over such an unusual accomplishment tends to smother the many poor or entirely unsuccessful results, these being regarded as inevitable. Thus, mediocrity persists.

Ordinary observation shows that the condyles are not joined together directly; they have an indirect connection at the symphysis. Such a connection is commonly known in mechanics as an "offset." The entire mandible is unique in being

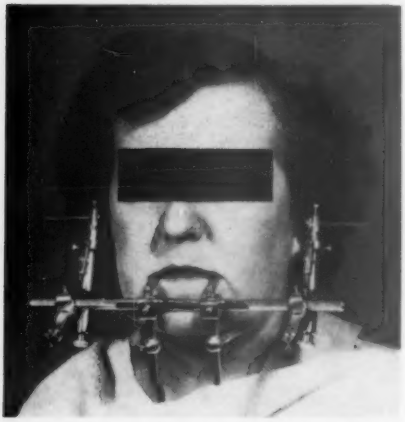

Fig. 1 • A hinge bow

a type of mechanism that rotates in three dimensions around two independent sets of axis bearings that assume control together or alternately; namely, the right and left temporomandibular joints. These joints exercise simultaneous control over the opening and closing components only. Opening and closing rotation continually involves transverse axes although these are not necessarily the same ones all the time. The action is similar to that of any mechanism that rotates around one or more translating fulcrums. The vertical and sagittal axes that control side-to-side and jaw rocking components respectively always operate in one joint at a time, never in both. If they operated in both joints at the same time, the jaw would be locked against all but opening and closing rotation as applies among the canines and felines.

In 1927, McCollum and Stuart[1] developed what they called a "three piece facebow" which they used to locate the transverse hinge-axes. A similar device, more aptly called a "hinge bow," is shown in Figure 1. McCollum and Stuart[2] found that the transverse axes ". . . vary even in the same individual from one side to the other." How drastic this asymmetry can be is demonstrated by the out-of-line positions of the axis indicator pins on the right and left sides of the subject's face in Figure 1.

To facilitate transfer of these axes to an articulator, McCollum and Stuart, with their associates in the Gnathological Society of California, resorted to marking their location with dots of color on the skin. These dots were made by inking the nibs of the indicator pins (the pins aiming toward the sides of the head in Figure 1) and then sliding them inward in their sleeves until the skin was touched and marked. At this point, the errors in interpretation and application began.

Influenced, possibly, by the fact of a dot made on the skin on each side of the head, it was assumed that the subject had only one transverse axis and that it ran between these two dots. It is strange that such an assumption persisted for immediately thereafter, in the same report,[1,2] the axes dots are considered as being located on the lateral surfaces of the condyles. Again, the asymmetry of the axis locations is emphasized. The report states: "Two sets of radiographs (C) and (D) show the decided differences in form of the condylar processes and the difference in relation of the centers of action to the joints, as shown by the black dots."

It should hardly be necessary to explain why a dot made on the skin outside the head cannot be in the same position as a dot that is made on a condyle inside the head. Nor should it be necessary to argue that both dots must lie on a right line that can be only a continuation of the corresponding indicator pin axis, for the pin would be aiming at both points during the physical process of locating that axis.

Because of "the difference in relation of the centers of action to the joints" already quoted from McCollum and Stuart, a single, intercondylar axis line drawn through the head and connecting the skin dots cannot coincide with an axis line drawn through the head and connecting dots on the lateral surfaces or

on any other surfaces of the condyles. If it could, the McCollum group and all other researchers, every one of whom has proved beyond any doubt that the same subject's transverse axes are never symmetrically positioned, would be wrong.

If there were a point rotation center in each joint, it would probably lie somewhere inside the joint, not on the outside of the skin or on a condyle's lateral surface. Granger[3] acknowledges this with, "In pure vertical motion it [the condyle] revolves about a horizontal axis; in pure horizontal rotation it revolves about a vertical axis. In any intermediate rotation it revolves about an axis at right angles to the plane of rotation. All of these axes meet at a point within the condyle. This is the mysterious center of rotation. When these two points in the condyles are connected by an imaginary line, it forms the hinge axis." Then, he adds, ". . . all rotary movements of the condyle take place around the same center. . . ." Assuming that Granger is right, this is where it would lead.

Along a continuation of each axis indicator pin and in the approximate middle of each condyle, the reader should imagine his own points and then connect them. It will be quite apparent that this axis line will have no coincidence with either of the two axis lines previously discussed. It begins to appear that a single, intercondylar axis is entirely dependent on the position given the dots. Thus, it becomes paramount to seek means of locating this "mysterious center of rotation," this "point within the condyle" where "all of these axes meet" and around which "all rotary movements of the condyle take place." It is already clear that these points cannot be the skin dots; these are merely indications of the relative locations of the transverse axes as they emerge from the head—not the points where all three axes might intersect. Where the transverse, vertical and sagittal axes make such a common intersection must be found; that is, if they do.

Vertical axes can be located in two ways. In one, the subject scribes two Gothic arch tracings simultaneously on plates set in front of the face and well to the right and left of the median line respectively. Scribings may be recorded with plates in other locations, but the objective and the result would be the same. The scribed plates must then be oriented in the articulator in exactly the same tridimensional relationship to the instrument transverse axes as they bore to these axes in the head. If a ball joint articulator had an intercondylar distance adjustment and if it were sufficiently sensitive, vertical axes adjustments might then be made until the Gothic arch tracings scribed by the jaw could be followed precisely by the instrument. Naturally, nothing less than precision would be acceptable, something almost impossible to prove merely by observing the path of a stylus along a wing of a Gothic arch tracing, a tracing which is only a half-inch segment of a circle with approximately a ten inch diameter.

The second method utilizes lateral wax records and is based on the axiom that control of three points on an arc of a circle means control of the entire circumference. Lateral jaw records are taken and instrument vertical axes are adjusted to accept them. More lateral records of varying vertical and lateral jaw positions are then taken and tested to see if they are accepted by the same vertical axes settings. When three records of various opening and lateral amplitudes are accepted by one fixed vertical axis in the articulator, this axis is clearly correct. It is not only proof of temporomandibular joint vertical axes and of their duplication in the instrument but of the Bennett movements as well. Whether one argues that the Bennett movement occurs in opening and closing or in lateral excursions, this cannot be denied for the wax records accepted by the fixed vertical and transverse axes are a combination of both.

Regardless of the method used, should

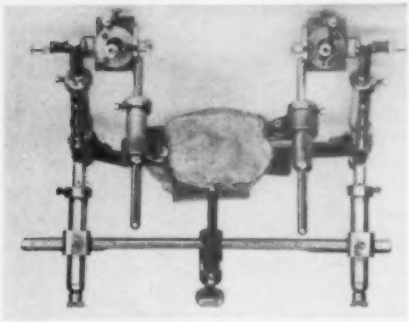

Fig. 2 • Relationship between transverse and vertical axes in typical head

vertical axes prove to intersect transverse axes in the articulator, it would be possible to add the sagittal axes. Should these also show a common intersection with the other two axes, the "mysterious center of rotation" would have been found and proved to be a point; one around which "all rotary movements of the condyle take place."

Should the vertical axes fail to intersect the transverse axes, there would be no object in trying to add the sagittal axes and it would be evident that a point rotation center does not exist. If point rotation centers do not exist, it will be impossible to draw any line, "imaginary" or otherwise through the head connecting them, which would be proof that a single, intercondylar transverse axis is an illusion. A test of this follows.

Figure 2 shows the actual relationship between the transverse and the vertical axes in a typical head. The vertical axes were located and their relationship to previously verified transverse axes proved by the second of the two methods previously described. The sagittal axes cannot be seen but were added by adjusting and locking the angles of the joint mechanisms where the teeth gripped one lateral record evenly. Sagittal axes were then verified by acceptance of the same varied records that proved the vertical axes. A casual glance shows that the vertical axes do not intersect the transverse axes, so, in this instance at least, there is no point rotation center in each condyle and, hence, no intercondylar axis.

The example just cited is listed as "typical." To eliminate doubt, other instances were checked the same way with the same unvarying results. Actually, it was not necessary to make such a physical test. The whole question can be settled by two truths based on centuries of common knowledge; first, the only body that rotates around a point center in three dimensions is a perfect sphere; and, second, a condyle is far from being a perfect sphere. This is only one of the ways to demonstrate the fallacy of the single, intercondylar axis. Another follows.

By definition, an axis is always a line, never a point. Again, by definition, an axis is invariably perpendicular to the path or plane of rotation it controls. That means that the transverse axis of each joint is a line and both of these are perpendicular to the same plane of opening and closing rotation. The significance of the fact that these two transverse axes are never symmetrically positioned in the same head now becomes inescapable; being perpendicular to the same plane of rotation, they are parallel to each other even though asymmetrically positioned and, by definition, parallel lines never meet. Again, the single, intercondylar transverse axis is proved to be an impossibility. Nor is this all.

Once more by definition, an axis is a line that is invariably perpendicular to the plane of rotation it controls. The hinge indicator pins of all properly constructed hinge bows are fixed so as to be parallel to one another. No matter how asymmetrically located they may be when finally adjusted to the subject's transverse axes, this parallelism continues. How could a line drawn between the nibs of these pins, a line that must be oblique because the pins lie in different planes, ever be perpendicular to the opening and closing path of jaw rotation?

Suppose it were assumed that a single, intercondylar axis is a sound theory. Then, the only type of hinge bow that could possibly locate transverse axes accurately would be a one-piece, nonadjustable bow with hinge indicator pins aligned in perfect symmetry. Only the pin on one side of the head would need to be adjusted to the axis and it would aim directly along the intercondylar axis line (if one existed) into exact confluence with the joint axis and the axis of the indicator pin of the bow on the other side of the head. That the one-piece, nonadjustable bow was found to be worthless should, by itself, be ample evidence against the intercondylar axis theory.

The principles just discussed are illustrated in Figure 3 with sufficient exaggeration to emphasize the fallacy of the intercondylar transverse axis. The two parts of this illustration demonstrate the inaccuracy of the intercondylar axis articulator when the axis indicator pins are slid inward to meet the centering indentations of the axle studs as compared to the inaccuracy when the studs are screwed out to meet the pins. It is evident that neither has any semblance of precision and the greatest inaccuracy occurs when the studs are screwed out to meet the pins. This can be verified readily by laying a ruler along either axis indicator pin, and noting where the ruler edge passes the midline of the instrument's condyle slot housing. In neither instance will the ruler pass at a point that coincides with the articulator condyle ball center: the "mysterious center" around which rotation in all three dimensions must take place in such an articulator.

Returning once more to well-known axioms, the transverse axes must be perpendicular to the plane of opening and closing jaw rotation. It is evident that the axis indicator pins in Figure 3 conform perfectly to that requirement and, despite their asymmetrical positions on the head, are also parallel to one another. But, the mounted case must, as is also perfectly obvious, rotate in a plane, while the articulator is being opened and closed, the plane being perpendicular to the single, intercondylar transverse axis that lies between the nibs of the indicator pins. With the articulator axis passing obliquely between the nibs of the pins, how could the instrument's opening and closing agree with the jaw's opening and closing?

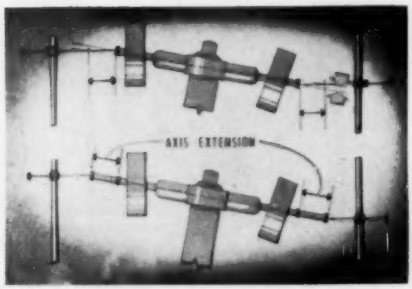

Fig. 3 • Demonstration of inaccuracy of intercondylar axis articulator

THE REMEDY - INTRAFOSSAL AXES

Since the jaw moves and since it can and always does close to exactly the same terminal position, it is a precision instrument subject to and controlled by the same mechanical laws that control the movements of any machine. Anyone who professes belief in "centric occlusion" can hardly dispute this, for, if there is no exact terminal closure, "centric occlusion" is meaningless. Muscles supply the direction and power, ligaments function to determine joint articulation positions and limitations, while joint rotation centers (hinge-axes) and their radii contribute mathematical precision. Like the axes of all machines, the temporomandibular joint hinge-axes reside in and are under control of the fixed members (fossae) rather than the moving members (condyles). Statements that axes are constant to the mandible, meniscuses or condyles have no basis in fact.

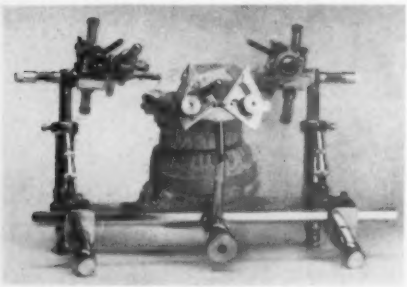

Fig. 4 • The Transograph

Design of an instrument that will duplicate essential jaw function accurately must begin with the controls. Only the last few millimeters of closing (the terminal functional orbit) are classed as essential. During closure within the confines of the terminal functional orbit, one or both condyles (usually one) engage in pure rotation modified only by the Bennett movement. Only one of the three jaw rotational components is under control of axes operating simultaneously in both joints; namely, the opening and closing. The lateral and rocking components are under control of the vertical and sagittal axes of the working joint alone while the nonworking joint acts as an adaptable universal joint for jaw and temporomandibular joint protection. The opening and closing (transverse) axes of the two joints have no more direct physical connection with each other than do the right and left vertical and sagittal axes that control the lateral and jaw rocking rotations.

All axes being lines, an accurate mechanical duplicator must be designed with pin and sleeve or plate and sleeve bearings instead of the conventional ball and socket construction. The latter is equivalent to a point rotational center, something a condyle, being a misshapen body, cannot have. The condylar mechanisms must be attached to the lower member whereas the fossal mechanisms must be attached to the upper. The transverse axes being asymmetrically positioned, the instrument must be slightly flexible because a rigid construction with out-of-line transverse axes that must operate simultaneously would be immovably locked. Connections between the right and left instrument joints must simulate the head joint connections; they must be made indirectly through the mounted casts just as the joints are connected indirectly by the offset maxillary and mandibular bodies in the head. Finally, all six axes must be capable of individual, independent and precise adjustment that will accept perfectly all essential jaw records.

The articulator (Transograph) pictured in Figure 4 meets these specifications. Other requirements, such as an adjustable mandibular angle, cranial plane, envelope of motion and the all-important functional jaw pattern that lies within this envelope of motion are also incorporated. However, as was indicated by the title, the purpose of this paper was to discuss only the pros and cons bearing upon the single, intercondylar axis concept versus the intrafossal or split axes concept. This has been done.

*Forrest R. Slavens, secretary, 730 Republic Bldg., Denver.

1. McCollum, B. B., and Stuart, C. E. A research report. South Pasadena, Calif., Scientific Press, 1955, p. 14.

2. McCollum, B. B., and Stuart, C. E. A research report. South Pasadena, Calif., Scientific Press, 1955, p. 17.

3. Granger, E. R. Centric relation. J. Pros. Den. 2:160 March 1952.

Photography: a hobby and a helper

R. B. Terkoski, D.D.S., Glen Lyon, Pa.

Photography can enrich both the professional and personal aspects of the dentist's life. The 35 mm. camera is suited for use in both fields. The rangefinder design and the single-lens reflex design, with either leaf-type or focal plane shutters, have characteristic qualities. The prudent purchaser should decide what features he requires in a camera, the price he is willing to pay, and make his selection accordingly.

For the dentist who feels confined to a very small area of operation, there is a wonderful new world easily opened to him in both his professional and personal lives. The door to it is photography; a camera is the key.

As a hobby, photography is not so severe a taskmaster as many another diversion; as a helper, it is virtually without an equal. One picture is worth a thousand words, and often prevents misunderstandings and confusion. The obstacles that dental terminology present to the nonprofessional are eliminated by a photograph, because the thing speaks for itself and surmounts semantic difficulties. Words such as small, conspicuous, swollen, chipped and so on assume definite meanings in a picture and, moreover, constitute a permanent record. Color slides and prints and black-and-white prints can also be used widely for before and after studies, to demonstrate step-by-step procedures in various technics and to record unusual pathologic conditions. Such illustrations are also valuable aids in case presentation to patients where one picture will show clearly what many words may not explain. In accident cases, the threat of litigation, or for insurance adjustments, photography can supply the most convincing evidence as to the nature and extent of injuries suffered. For example, Figure 1 clearly shows the results of two school accidents. Both were described by patient and school nurse alike as "chipped front teeth." The photographs not only show the nature of the damage but also indicate how two identically described injuries are very different as to extent. Such clinical pictures require a camera with good optics, and must be made at very close range. Close-up photography of this type generally is achieved by one of two reliable methods, both of which alter the characteristics of the camera being used.

The first method is through the use of extension tubes which increase the distance from the taking lens to the film. The second and easier solution is to use supplementary or close-up lenses attached to the front of the taking lens, which decrease the focal length of the

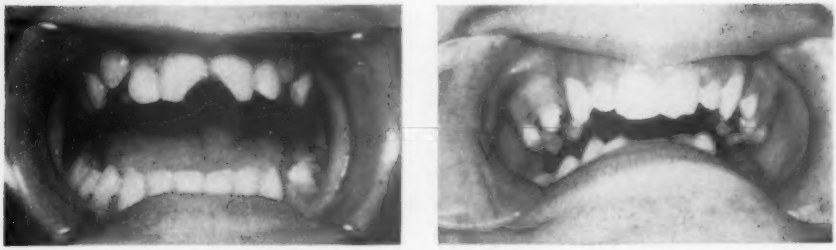

Fig. 1 • Fractured anterior incisors

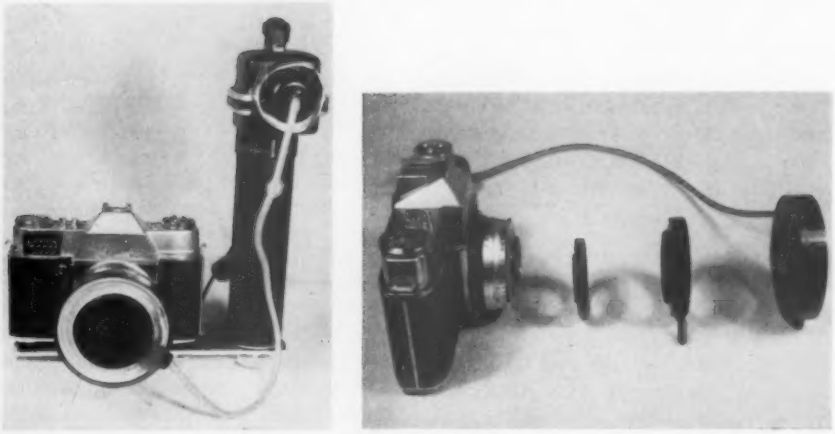

Fig. 2 • Left: Circle flash in place on camera. Right: Circle flash and drop-in lens, exploded view

Fig. 3 • Cheek retractors

original lens. These usually are sold in sets for different distances. In all close-up photography, there is little margin for error, but there is adequate equipment to prevent it.

A good photograph must be sharp and have adequate contrast. Besides a good camera, it takes special lighting to achieve this. Lighting the oral cavity which has heretofore been a separate and difficult problem, now is admirably solved by the use of an electronic circle light[1] which surrounds the lens, and works efficiently and easily (Fig. 2). This particular light accepts drop-in close-up lenses which further simplifies the task. Cheek retractors (Fig. 3) and good quality front surface mirrors are the only additional equipment required.

In short, an investment which is small when compared to the outlay incurred in

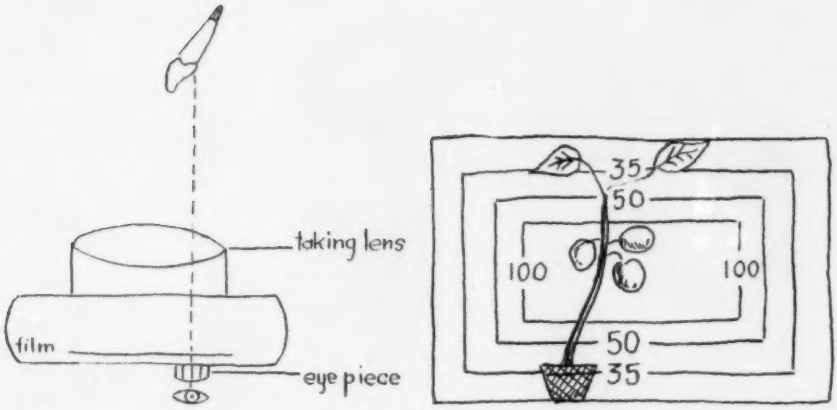

Fig. 4 • Left: RF viewing. Right: RF field markings

equipping an office can add a great deal to one's practice. There is hardly any other single factor which impresses patients more than visual education.

In our private lives an even wider use of the camera obtains from the desire to record passing events and stages in the growth and development of our families. It enables us to preserve forever those brief moments which would otherwise be lost or dimmed in memory. The satisfaction derived from such mementos increases with the years. The 35 mm. camera is the versatile instrument that is pre-eminently suited to both these tasks, since its compactness and ease of operation make it a convenient tool.

Recently, however, camera manufacturers have taken a page from the automobile maker's handbook and have flooded the market with new models, not necessarily incorporating new features, but at least appearing superficially different. In addition, the advent of automation in photography has added considerable confusion as to which one camera would best satisfy personal and professional requirements. Price range alone is not a reliable criterion, for the characteristics of cameras vary as much as do those of automobiles; one might own a 100 mph two-seater sportscar or a nine-passenger station wagon for the same cash outlay. Obviously, each has different characteristics; so it is with the cameras. The confusion notwithstanding, two good 35 mm. cameras are available: the range-finder design (RF) or single-lens reflex design (SLR).

The RF camera has a built-in coupled mechanism, independent of the picture-taking lens. This determines the exact range or distance from camera to subject and shows the image of the subject to be photographed (Fig. 4, left). The RF is the earlier design, but is still chosen by many who wish to take fast "available light" pictures and snapshots. It functions best with the "normal" focal length lenses of about 50 mm. and those that are shorter and have a wider angle of view. It is also at its best with subject distances greater than three feet. The RF camera may use a focal plane shutter or a leaf type shutter.

The SLR camera is equipped with a different type of viewfinder. Instead of a similar image or facsimile as seen with the RF camera, here the photographer sees exactly what the picture will be since he is viewing through the lens (Fig. 5) and parallax problems do not exist. Fig-

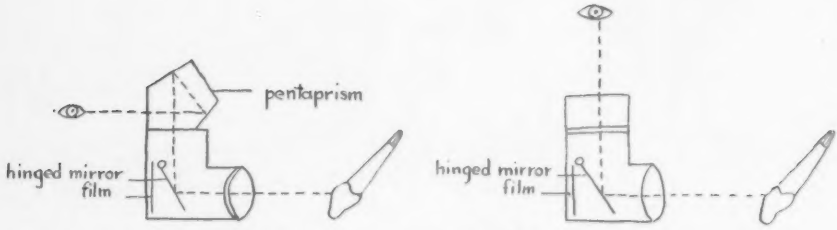

Fig. 5 • Left: SLR viewing, eye level. Right: SLR viewing, waist level

ure 6 shows the type of critical close-up focusing possible. With the SLR, what you see is what will be photographed regardless of which lens is being used on the camera, whereas the RF has to depend on markings such as shown in Figure 4, right, or use auxiliary viewfinders to preview the resulting photograph. Obviously, this is a great problem at very close ranges. Some SLR's offer the considerable advantage that the photographer can determine visually the depth of field at different lens openings. Figure 6 shows the exact type of focusing possible without guesswork. This is a major consideration with great focal lengths and close-up work, for it shows exactly what is in focus, but is not so vital in shots taken with short focal length lenses, because of the greater depth of field inherent in such lenses. The SLR also may have a leaf type or focal plane shutter.

That all the better 35 mm. cameras accept interchangeable lenses is a major contribution to their versatility. In fact, when lenses are changed, it is the same as creating a whole new camera. As already shown, the type of camera is determined by how the photographer views his subject, either reflexly or through a rangefinder-viewfinder combination. These two types are further subdivided as to the kind of shutter they use.

The better 35 mm. cameras, then, can be logically classified thus:

A. Single lens reflex cameras

1. With leaf-type shutters

Examples: Retina Reflex S, Agfa Ambiflex, Savoy Reflex, Contaflex, Bessamatic

2. With focal plane shutters

Examples: Alpa, Beseler-Topcon, Canonflex, Contarex, Exakta, Pentax H-2, Nikon F, Konica

B. Rangefinder cameras

1. With leaf type shutters

Examples: Ambi-Silette, Aires V, Argus C-2, Century, Kodak Retina III S, Minolta, Voightlander, Yashica Y-F

2. With focal plane shutters

Examples: Canon, Honor, Leica, Nikon

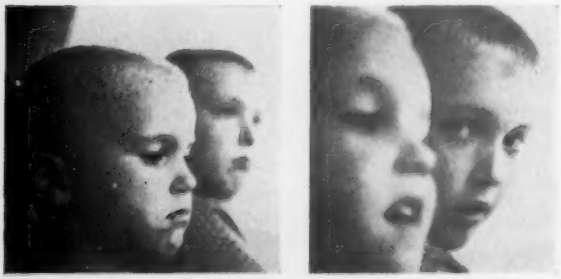

Fig. 6 • Critical focus possible

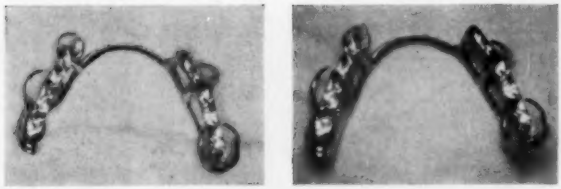

Fig. 7 • Left: Bite raiser photographed with Retina S. Right: Bite raiser photographed with Startech

The list of examples is not complete but gives an indication of the great variety available.

If very fast lenses for poorly lighted subjects and extremely high shutter speeds will never be utilized, obviously they are not required and should not be purchased. It is one thing merely to get use out of an instrument and quite another to get the intended use from it. A prosthodontist normally would not be interested in a dental unit because it had the smoothest air turbine, nor would an orthodontist pay the additional cost to equip his office with automatic amalgamators. Neither should the photographer-dentist pay for features he is not interested in and will never use. The point is, however, that he should not be deprived of features he does want on the basis of price alone. If he requires fast lenses for available light pictures, he might not even be interested in reflex viewing. It may be that good picture composition and moderate shutter speeds are what he wants most. It is well to decide this at the outset because both types of cameras come in wide price ranges, and the prices are not proportional to the number of features present. Usually, the price is proportional to the quality of the features that exist, so it would be prudent for the potential purchaser to decide first what features he requires, and then to what price level he will, or he must, go. This is mentioned because even a quick comparison of features and prices reveals some great discrepancies.

RF cameras impose some limitations which may not affect one's type of photography, but which should be expected to cost less if all other things were equal. This is not always true in practice. Furthermore, one can pay a great deal more for faster lenses and sacrifice reflex viewing and it is questionable if this is wise (especially if one intends to do extremely close-up work), since the appearance of extremely high sensitivity film emulsions at least in part eliminates the need for ultra-fast lenses. Certainly there will be little urgent need for f1.4 lenses. In short, one can still pay much and not get the features one wants.

If the dentist requires a camera only occasionally for close-up work, for example, and does not care about any other application, something outside the 35 mm. camera field will satisfy his needs. Kodak's Startech camera requires no complicated manipulation and still produces good quality 127 size transparencies which fit in the standard 2 by 2 inch mounts for projection. This camera is in many ways a remarkable development. Although it is a relatively inexpensive outfit, it employs clever anti-parallax framing devices and uses color coded close-up lenses. Using extremely small F stops, it produces pictures of satisfactory quality with good definition and wide depth of field. Ektachrome color film for slides and Panatomic X black and white film are available in its size. Now the Retina reflex will render more precise results, and lends itself better to personal requirements. Then, too, there are reflexes such as Exakta, Canon and Nikon which have the additional features of faster lenses and faster shutter speeds. Figures 7 and 8 show comparisons of the same subject photographed with different

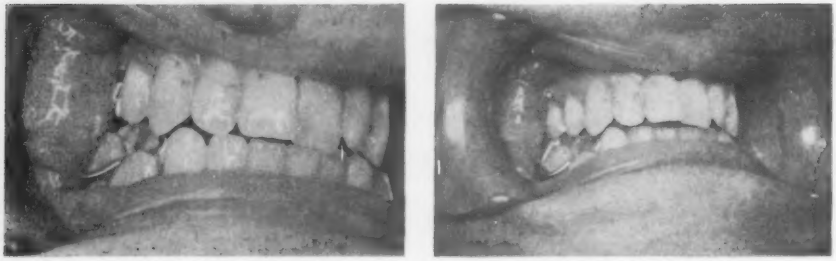

Fig. 8 • Centric occlusion photographed with Retina S. Right: Centric occlusion photographed with Startech

cameras. Obviously, if close-ups such as these were the only employment the camera were to have, either one would do, and the cheaper one would be the logical choice. As pointed out earlier, it is the dentist's need or preference, not just the price range, which should determine which camera he chooses.

For the neophyte who is convinced of the potentials photography offers him, he may use the following guide. If he prefers a simple box-type camera for occasional close-up work only, and one that requires no deep investigation into the photographic art, the Startech is a good choice, for a relatively small investment. Its limitations do not make it a good all-around camera, but for its intended purpose, it is most satisfactory.

For the opposite type of photographer who wishes to put the fewest limitations on his aspirations in photography, the SLR cameras such as Exakta, Nikon F, Canonflex, or Beseler-Topcon are good. The RF cameras such as Canon or Nikon with very fast lenses and shutter speeds should appeal to the candid cameraman who wishes to use available light. And in this application they are better than the SLR.

For the individual who wants a superior quality camera throughout, but wants one that will do at least some of the "thinking" for him—through automation—a camera of the Retina reflex type is an excellent choice and a very versatile instrument. With this type of camera, it is possible[1] to shoot all sorts of subjects: microscopic studies, moles, mountains or the moon. This type is also more efficient with the use of flashbulbs and should, therefore, appeal to the snapshooter, because the leaf-type shutter does not require the critical lighting the focal plane shutter needs. Here is the happy middle ground.

97 West Main Street

1. Courtesy, Lester A. Dine Company.

Spirit of Progress • Through some manner of alchemy at all levels of society, there must be a cultivation of a taste for learning, for scholarship, and for all that is excellent in mind and spirit. *J. A. Stratton.*

Developmental microstructure and fluorine content of Alaskan Eskimo tooth samples

Gisle Bang, D.D.S., Oslo, Norway

The developmental microstructure and the fluorine content of teeth from contemporary Alaskan Eskimos and from skulls of Alaskan Eskimos who had had no contact with Western civilization were studied. The diet of "primitive living" Eskimos is not necessarily adequate for the formation and calcification of a perfect tooth structure. Caries-free teeth can be retained throughout life under primitive living conditions even though the dentition is not perfectly formed. The fluorine analyses of teeth from contemporary Eskimos revealed no significant difference between samples from persons with and without caries or between anterior and posterior teeth.

"Primitive living" people have in general little or no caries as long as they subsist on their native diet.[1-5] Few studies have provided conclusive data to indicate whether this is due to a superior developmental structure of the teeth or merely to a favorable oral environment. Mellanby[6] suggests that the diet of the primitive living Eskimo favors the production of well-calcified caries-resistant teeth. When dietary changes occur among "primitive living" people, the younger generation generally exhibits a more rapid increase in caries susceptibility than do the older people.[2,4,5] A limited sample of teeth examined by Moorrees[7] revealed a greater degree of faulty microstructure in teeth from young Aleuts than in samples from the older generation. Teeth from the relatively isolated islanders of Tristan da Cunha, although known for a low caries incidence, were not, according to Sognnaes,[4] of a uniformly superior microstructure.

In a study of teeth originating from paleolithic, prehistoric and ancient man, Sognnaes[8] described a high incidence of developmental microscopic defects throughout human history. This was in contrast to the relative perfection of the tooth structure in lower primates.

Pedersen and Scott,[9] by means of replica studies, made the startling observation that the Eskimo tooth surfaces were more irregular both microscopically and macroscopically than those of white American control subjects. This structural feature was thought to be due to influences of a nongenetic nature during tooth formation.

Previous publications[10,11] indicate a positive correlation between the fluorine (fluoride ion) content of the drinking water and the fluorine content of the teeth. Sognnaes[4] and Shaw and others,[12] however, reported a high fluorine content in teeth from communities with water

supplies of low fluorine content. Sognnaes suggested that the fluorine was provided by the high salt-water fish consumption in the area. Shaw and others attributed the higher fluorine content in their material to a probable higher water consumption, or an additional source of fluorine in the diet, a higher rate of absorption and utilization of the ingested fluorine or both.

The present study deals with the microstructure and fluorine content of teeth from contemporary Alaskan Eskimos. A study of this type apparently has not been done previously either histologically or chemically. In addition to teeth from contemporary individuals with and without caries, the study includes teeth obtained from skulls of Alaskan Eskimos who had had no contact with Western civilization.[13]

OBSERVATIONS

The teeth from contemporary Alaskan Eskimos were collected during a dental and dietary investigation conducted in the summers of 1955, 1956 and 1957. Three different Alaskan Eskimo villages were surveyed in the course of this study. They are: Anaktuvuk Pass, Point Lay and Point Hope.

General Conditions • Anaktuvuk Pass (lat. 68°N, long. 152°W) is the home of a group of 80 Eskimos. They live 3,000 feet above sea level in the Brooks Range in Alaska, and belong to the so-called Inland Eskimos, the Nunamiuts. They formerly lived a seminomadic life, settling for short periods of time only at places where the hunting and trapping proved best. A few years ago they settled permanently in Anaktuvuk Pass. They gradually began to consume goods from the local store, such as white flour, sugar, canned milk, tea, coffee, tobacco and candy. However, they still depend to a great extent on what they catch by hunting and fishing. They probably represent one of the most "primitive living" groups in Alaska.

A dental examination in 1955[5] showed that 6 of 15 individuals (40 per cent) within the age group one and one half to 12 years possessed caries-free deciduous teeth, whereas 26 of 38 individuals (68 per cent) over six years of age had caries-free permanent teeth. The fluorine content of the drinking water during the summer (river water) was 0.08 ppm and during the winter (melted ice and snow) was 0.02 ppm. A detailed description of other conditions among these Eskimos, their general health and living conditions, was given by Rausch[14] and Rodahl.[15]

Point Lay (69° 50′N, 162° 55′W) and Point Hope (68° 40′N, 166° 45′W) are located on the coast of Alaska facing the Arctic Ocean. They are both old settlements. The inhabitants' way of life is similar in both villages. Sea mammals and fish constitute their main source of food. However, the population has been exposed to white man's food much longer than the Inland Eskimos. This applies especially to the Point Hope Eskimos who had their first contact with white people about 100 years ago. Local stores have been in operation at both places for many years. Among Point Lay Eskimos examined in 1955[5] the age group one and one half to 12 years showed that 3 out of 20 children (15 per cent) had caries-free deciduous teeth, and 14 of 42 individuals over six years of age (33 per cent) had caries-free permanent teeth. The corresponding figures for Point Hope in 1956[5] showed that 2 of 27 persons (7 per cent) in the one and one half to 12 year age group had caries-free deciduous teeth and 14 to 72 individuals over six years of age (19 per cent) had caries-free permanent teeth. The fluorine content of the drinking water in Point Lay and Point Hope during the summer (river water and well water) was 0.10 ppm and 0.08 ppm respectively. During the winter the fluorine content of the water (old sea ice) was 0.08 ppm and

Table 1 • Origin of teeth prepared as ground sections for histological comparison

Location	Age range		No. of individuals		No. of teeth sectioned		
	Without caries	With caries	Without caries	With caries	Without caries	With caries	Total
			Contemporary Alaskan Eskimos				
Anaktuvuk Pass	11-73	15-27	4	4	6	5	11
Point Lay	16-80	12-51	2	3	3	4	7
Point Hope	66-69	9-72	3	5	5	5	10
			Alaskan Eskimo skulls				
Point Hope	> 20	None	7	None	14	None	14
Total	11-80	9-72	16	12	28	14	42

0.11 ppm respectively. Additional observations of the settlements and inhabitants of Point Lay have been presented by Rodahl and Bang[16] and of Point Hope by Van Stone.[17] The Alaskan Eskimo Skull Collection, which provided comparative material, was obtained through the courtesy of Dr. T. D. Stewart of the Smithsonian Institution. The late Dr. Hrdlicka brought the Eskimo skull material back from Point Hope.

Tooth Structure • After the clinical observations were completed, a limited sample of teeth from 21 individuals, predominantly men, from the three Eskimo villages (Table 1) was obtained. Nine of these persons, ranging in age from 11 to 80 years, were caries-free and contributed 14 intact teeth. For comparison, a sample of 14 teeth was obtained from 12 individuals, age 9 to 72 years, with caries. All but 2 of the 28 tooth specimens were permanent teeth. The sample consisted of 14 molars, 4 bicuspids, 7 cuspids and 3 incisors. About half of these teeth were fixed in a 70 per cent alcohol solution for microscopic examination. The rest were kept dry with a view towards chemical determinations. In either instance, a central slab could be removed for preparation of ground sections.

The sample of teeth from the Eskimo skulls consisted of 14 permanent teeth from seven skulls (three men and four women), one first molar and one third molar from each skull. For obvious reasons these were all dry, unfixed teeth.

Before the sections were prepared the surface texture of the teeth was examined under a ten-power binocular dissection microscope. Notations were made regarding abrasions, imbrication lines, general roughness, discolorations, fissures and cracks, in order to obtain an idea of the quality of the calcification. Mellanby[6] found a correlation between the quality of surface texture and microstructure of dentin and enamel. Similar observations were made by Sognnaes.[4] Longitudinal sections from each tooth were imbedded in plastic and ground sections were prepared using a modification of the technic described by Sognnaes.[18]

Only 1 of the 42 teeth examined (a mesiodens from a ten year old boy) had a surface texture which could be classified, by Mellanby's standards,[6] as perfect. The other teeth exhibited mild to moderate irregularities and four teeth showed evidence of gross hypoplasia. This would seem to bear out the replica studies of Pedersen and Scott.[9]

None of the ground sections exhibited

a perfect microscopic tooth structure when examined in transmitted light. In all of the teeth there were varying degrees of interglobular dentin spaces, areolar dentin, accentuated incremental lines and enamel "pigmentation" (Fig. 1-4). No clearcut difference was found in the microstructure of teeth from contemporary Eskimos, with or without caries, or between these and the teeth from the Eskimo skulls. Nor were there any apparent differences in the microstructure of teeth from young or old persons within the sample from the contemporary Eskimos.

Fluorine Content • A dental survey[5] carried out during 1955 to 1957 in the three afore-mentioned villages, and including 277 Eskimos, showed no incidence of mottled enamel.

Twenty-three of the permanent teeth from contemporary Eskimos and seven from the Point Hope Eskimo skulls (Table 1) were subject to chemical analyses for fluorine content.

After the removal of a central slab for histological examination, the remainder of the tooth was analyzed with regard to fluorine content using the method described by Shaw and others.[12] The results are presented in Table 2.

Although there was no statistically significant difference (enamel, CR=0.5; dentin, CR=0.7) between the fluorine content of the teeth from the "present living" Inland Eskimos and Eskimos from the two coastal villages, there was a significant difference (enamel, CR=6.7; dentin, CR=4.9) between the total average for contemporary Eskimos and the average value for teeth from the Point Hope skulls. This difference was also significant (enamel, CR=5.9; dentin, CR=4.1) when persons below 20 years of age were excluded from the contemporary Eskimo sample.

The average fluorine concentrations in the enamel (103 ppm) and in the dentin (220 ppm) of the teeth from contemporary Alaskan Eskimos were in keeping with the values reported from other regions with comparable low concentrations of fluorine in the drinking water (Table 3). In contrast to this the fluorine concentrations in the enamel (253 ppm) and dentin (508 ppm) in teeth from the skulls were extremely high and appeared to be of the same magnitude as the values reported from Delhi, India,[12] on contemporary Indians.

In contrast to Armstrong and Brekhus,[19] but in keeping with the findings of McClure,[20] there appears to be no significant difference (enamel, CR=0.6; dentin, CR=0.8) in the fluorine content in teeth from contemporary Eskimos with caries and without caries (Table 4).

A statistical evaluation of this material does not reveal any significant difference (enamel, CR=0.5; dentin, CR=1.2) in

Fig. 1 • Ground section of upper left cuspid of 18 year old caries-free boy from Anaktuvuk Pass. In the cervical portion of the tooth there is granular to areolar dentin with several interglobular dentin spaces indicating failure in the calcification. There is scalloping of the dentino-enamel junction (fluorine content: enamel 66 ppm, dentin 119 ppm)

Fig. 2 • Cervical portion of upper right bicuspid of 69 year old caries-free man from Point Hope. The ground section showed pronounced incremental lines in the enamel, a general granular and areolar appearance of the dentin with a number of large interglobular dentin spaces (fluorine content: enamel 109 ppm, dentin 242 ppm)

Fig. 3 • Coronal portion of lower left third molar of adult caries-free woman from the collection of Point Hope Eskimo skulls at the Smithsonian Institution. Pronounced incremental lines are noted in the enamel. There is areolar dentin with several pronounced interglobular dentin spaces (fluorine content: enamel 219 ppm, dentin 345 ppm)

Fig. 4 • Mandibular right third molar of adult caries-free woman from the collection of Point Hope skulls at the Smithsonian Institution. The enamel in the coronal part exhibits many pronounced incremental lines (fluorine content: enamel 201 ppm, dentin 510 ppm)

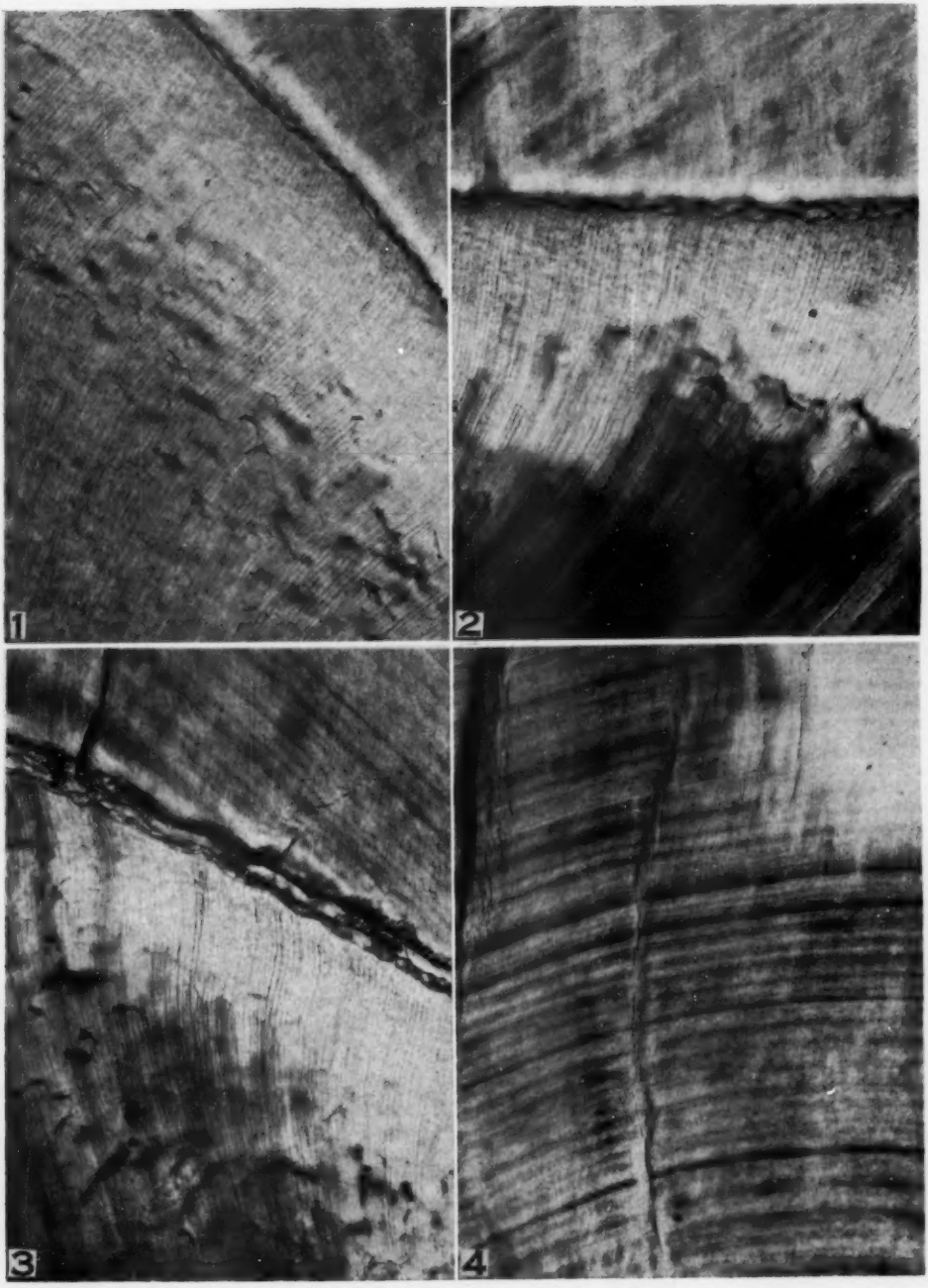
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Table 2 • Fluorine content of permanent teeth from Alaskan Eskimos

Location	No. of cases	Age		Fluoride content of drinking water (ppm)		Fluorine content of enamel (ppm)		Fluorine content of dentin (ppm)	
		Average	Range	Summer	Winter	Av'ge	Range	Av'ge	Range
Anaktuvuk Pass	8	27	11-73	0.08	0.02	96	33-199	194	50-536
Point Lay	7	36	12-80	0.10	0.08	99	60-193	202	98-424
Point Hope	8	49	9-72	0.08	0.11	116	25-152	262	67-357
Total average for contemporary Eskimos	23	37	9-80	—	—	103	25-199	220	50-536
Skulls, Point Hope	7	Adults		<0.1*		253	167-339	508	298-685

*The Point Hope Eskimos have been living at the same location for centuries and there is no reason to believe that the fluoride content of the drinking water may have been greater in the past.

the average fluorine concentrations in anterior teeth compared with posterior teeth (Table 5) as suggested by Sognnaes.[4]

DISCUSSION

Tooth Structure • Although assumptions to the contrary have been made in the literature, it is perhaps not surprising to find a high degree of faulty microstructure, both in teeth from "present living" caries-free Eskimos and in caries-free teeth from Eskimo skulls. In general, it is well known that human teeth are very sensitive to metabolic and nutritional disturbances during their period of formation and calcification. Primitive man is not necessarily protected from such episodes as suggested by the faulty tooth structure of teeth from prehistoric man.[8]

Table 3 • Comparison between fluoride content of drinking water and permanent teeth in various communities

Location	Fluorine content of drinking water (ppm)	Fluorine content of enamel (ppm)	Fluorine content of dentin (ppm)
Aurora, Ill.[11]	1.1-1.2	133	385
Boston, Mass.[12]	0.12	40	85
Boston, Mass.[12]	0.12	58	109
Oslo, Norway[11]	0.2-0.4	79	86
Georgia[11]	0.1	86	216
Anaktuvuk Pass, Point Lay and Point Hope, Alaska	0.02-0.11	103	220
Tristan Da Cunha[4]	0.2	140	270
Bombay, India[12]	0.04	184	456
Skulls, Point Hope, Alaska	<0.1*	253	508
Delhi, India[12]	0.25	299	710

*See footnote Table 2.

Table 4 • Fluorine content in permanent teeth from contemporary Alaskan Eskimos with and without caries

	No. of cases	Age		Fluorine content of enamel (ppm)		Fluorine content of dentin (ppm)	
		Average	Range	Average	Range	Average	Range
With caries	13	31	9-72	109	25-199	203	67-424
Without caries	10	46	11-80	95	33-152	243	50-536

Until recently the Eskimos have been completely dependent on hunting and fishing, and it is well known that at times when the game has been scarce whole Eskimo settlements have been exposed to periods of starvation or semistarvation. Thus, several Inland Eskimos starved to death in the early part of this century when the caribou herds failed to appear, and the tribe was forced to move to the coast until the hunting conditions again proved favorable in the mountains.

A dietary study[5] carried out during 1955 and 1956 at Point Lay showed that one family consisting of two adults and seven children at times subsisted on as little as 250 to 450 calories per person per day. Therefore it seems that, even with the conditions under which these Eskimos live, a perfect tooth structure is not necessarily guaranteed nor is a perfect tooth structure apparently essential under primitive living conditions to maintain caries-free teeth throughout life.

The fact that the younger generation is more caries-susceptible than the older Eskimos when they are exposed to the so-called white man's food may be explained on the basis that younger people more easily take on a new food regimen, whereas adults tend to retain more of their old dietary habits.

Fluorine Content • The number of teeth available for study was limited.

Because 12 of the 23 teeth from contemporary Eskimos were preserved in a 70 per cent alcohol-water mixture for up to two years prior to the fluorine determinations, there is a possibility that some of the fluorine may have been dissolved from the teeth by this solution. However, in the material from the contemporary Eskimos there appears to be no significant

Table 5 • Fluorine content in anterior and posterior permanent teeth from contemporary Alaskan Eskimos

	No. of cases	Age		Fluorine content of enamel (ppm)		Fluorine content of dentin (ppm)	
		Average	Range	Average	Range	Average	Range
Anterior teeth	8	33	11-80	84	33-137	202	50-357
Posterior teeth	15	40	9-73	111	25-199	230	67-536

Table 6 • Calcium content of drinking water

Location	Winter (Oct.-June) ice water (ppm)	Summer (June-Oct.) river water (ppm)
Anaktuvuk Pass	1.0	16.4
Point Lay	1.4	22.4
Point Hope	1.9	33.6

difference (enamel, CR=0.4; dentin, CR=0.1) between the fluorine content of the teeth fixed in alcohol and the teeth kept dry.

On the other hand, the teeth from the Point Hope skulls, which have been buried relatively close to the ocean for many years, may have obtained additional fluorine because the soil water routinely contains traces of fluorine.

During life, enamel surfaces increase in fluorine content in rough proportion to the duration of exposure to the oral fluids.[21,22] In experimental situations powdered enamel takes up fluorine from solutions.[23] These two facts lend credence to the assumption that additional fluorine may have been absorbed by the teeth from the Eskimo skulls.

However, the finding of an extremely high fluorine content in the teeth from the skulls, could possibly also be explained on the basis of a high fluorine content in the diet. The coastal Eskimos, who formerly subsisted mainly on sea mammals, fish and marine plants which often were partly boiled in sea water, have, since their contact with western civilization, gradually changed their food habits. There has been a gradual increase in the amount of imported foodstuffs bought from the local native stores, especially during the last two decades. The Inland Eskimos used to migrate to the coast every spring. There they spent the entire summer and early fall fishing and hunting sea mammals. Since 1935, however, they have lived permanently in the mountains with no access to sea mammals or salt water fish, their main food now being the caribou. Providing the diet of the Eskimos from the earlier period had a higher fluorine content than the imported white man's food, this gradual change in diet could explain the pronounced difference in fluorine content in teeth from the contemporary Alaskan Eskimos and from the Alaskan Eskimo skulls.

According to Hoygaard[24] and Rosebury and Karshan[25] the Eskimo diet is low in calcium. Water samples from Anaktuvuk Pass, Point Lay and Point Hope (Table 6) revealed that calcium derived from the drinking water at these places is negligible. Pandit and others[26] and Massler and Schour[27] suggested that a low calcium intake might cause a higher absorption of the available fluorine. Provided the previous findings of a low calcium content in the Eskimo diet holds true for the Point Hope Eskimos from the earlier period, this, too, could be a factor in explaining the high fluorine content in the teeth from these people.

SUMMARY

The developmental microstructure of teeth from contemporary Alaskan Eskimos with and without caries, and of caries-free teeth from skulls of Alaskan Eskimos, who had had no contact with western civilization, has been examined.

All the 42 samples showed evidence of interglobular dentin spaces, areolar dentin, accentuated incremental lines and enamel "pigmentation."

It would appear that the diet of "primitive living" Eskimos is not necessarily adequate for the formation and calcification of a perfect tooth structure, and that caries-free teeth can be retained throughout life under primitive living conditions even though the dentition is not perfectly formed.

The chemical analyses of the tooth samples from the Point Hope Eskimo skulls revealed much higher average values for the fluorine content in the enamel and dentin than would be ex-

pected, considering the probable low fluorine content of the drinking water in that area (see footnote, Table 2).

The average fluorine concentrations in enamel and dentin of teeth from contemporary Alaskan Eskimos were comparable with values from other communities with a similar low content of fluorine in the water supplies.

The fluorine analyses of teeth from contemporary Eskimos revealed no significant difference between samples from persons with and without caries or between anterior and posterior teeth.

A probable influence on the fluorine content of the specimens preserved in an alcohol-water solution or those buried in the ground prior to the chemical analyses, as well as the possible relationship between dietary changes and the fluorine content of the teeth, are discussed.

Fredrik Gladsgt. 22c

1. Price, W. A. Nutrition and physical degeneration. New York, Hoeber, 1939.

2. Waugh, L. M. Nutrition and health of the Labrador Eskimo, with special reference to the mouth and teeth. J. D. Res. 8:428 June 1928.

3. Pedersen, P. O. Caries and Ernährung. Ernährung s Umschau 3:56 Sept.-Oct. 1954.

4. Sognnaes, R. F. Oral health survey of Tristan da Cunha. Det Norske Videnskaps-Akademi, Oslo, 1954.

5. Bang, G. Dental condition of Alaskan Eskimos (unpublished). 1958.

6. Mellanby, M. Diet and the teeth. Medical Research Council, Special Report Series No. 191, His Majesty's Stationery Office, London, 1934, p. 180.

7. Moorrees, C. F. A. The Aleut dentition. Cambridge, Harvard University Press, 1957.

8. Sognnaes, R. F. Histological evidence of developmental lesions in teeth originating from paleolithic, prehistoric, and ancient man. Am. J. Path. 32:547 May-June 1956.

9. Pedersen, P. O., and Scott, D. B. Replica studies of the surfaces of teeth from Alaskan Eskimo, West Greenland natives and American whites. Acta odont. scandinav. 9:262 Sept. 1951.

10. Boissevain, C. H., and Drea, W. F. Spectroscopic determination of fluorine in bones and teeth and other organs in relation to fluorine in drinking water. J.D. Res. 13:495 Dec. 1933.

11. McClure, F. J., and Likins, R. C. Fluorine in human teeth studied in relation to fluorine in the drinking water. J. D. Res. 30:172 April 1951.

12. Shaw, J. H.; Gupta, O. P., and Meyer, M. E. High fluoride content of teeth from communities with low fluoride water supplies. Am. J. Clin. Nutrition 4:246 May-June 1956.

13. Stewart, T. D. Personal communication (1957).

14. Rausch, R. L. Notes on the Nunamiut Eskimos and mammals of the Anaktuvuk region, Brooks Range, Alaska. Arctic 4:147 Dec. 1951.

15. Rodahl, K. Eskimo metabolism. Norsk Polarinstitutt Skrifter. Nr. 99. Oslo, Brögger, 1954, p. 83.

16. Rodahl, K., and Bang, G. Endemic goiter in Alaska. Arctic Aeromedical Laboratory, Ladd AFB, Alaska, Technical Note no. 9. p. 8, 1956.

17. Van Stone, F. W. Report on Air Force-Eskimo contacts. Arctic Aeromedical Laboratory, Ladd AFB, Alaska, Technical Note no. 15. p. 29, Dec. 1956.

18. Sognnaes, R. F. Preparation of thin "serial" ground sections of whole teeth and jaws and other highly calcified and brittle structures. Anat. Rec. 99:133 Oct. 1957.

19. Armstrong, W. D., and Brekhus, P. J. Possible relationship between the fluorine content of enamel and resistance to dental caries. J. D. Res. 17:393 Oct. 1938.

20. McClure, F. J. Fluorine in dentin and enamel of sound and carious human teeth. J. D. Res. 27:287 June 1948.

21. Perry, M. W., and Armstrong, W. D. On the manner of acquisition of fluorine by mature teeth. J. Nutrition 21:35 Jan. 1941.

22. Brudevold, F.; Gardner, D. E., and Smith, F. A. Distribution of fluoride in human enamel. J. D. Res. 35:420 June 1956.

23. Shaw, J. H. Personal communication (1958).

24. Hoygaard, A. Studies on the nutrition and physiopathology of Eskimos. Det Norske Videnskaps-Akademi, No. 9. Oslo, Dybwad, 1940.

25. Rosebury, T., and Karshan, M. Dental caries among Eskimos of the Kuskokwim area of Alaska. Am. J. Dis. Child. 57:1343 June 1939.

26. Pandit, C. G., and others. Endemic fluorosis in South India. Ind. J. Med. Res. 28:533 Oct. 1940.

27. Massler, M., and Schour, I. Relation of endemic dental fluorosis to malnutrition. J.A.D.A. 44:156 Feb. 1952.

Where Is Science Taking Us? • Into an age of familiarity with splitting atoms. It is an age of hidden perils, for none of man's senses can detect the presence of radioactivity. Yet the need for fuel for the future relentlessly drives man on to greater and greater use of a phenomenon he does not fully understand and can control only to a crude degree. How can it be assured that society will devise and enforce safeguards? *National Academy of Sciences of the United States. The Research Frontier. Saturday Review June 4, 1960, p. 48.*

Association between deciduous dentin sclerosis and calcium hydroxide methylcellulose base material

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One hundred and ninety-one deciduous teeth in which a calcium hydroxide methylcellulose base was used beneath the alloy restoration, and 160 deciduous teeth in which no base material was utilized beneath the alloy restoration, were studied. Roentgenographic examination indicated that 93 of the teeth containing a calcium hydroxide base material showed evidence of dentin sclerosis beneath the area of the base material. Only 1 per cent of the deciduous teeth without a calcium hydroxide base material showed evidence of sclerosis. Calcium hydroxide methylcellulose base material stimulates the production of sclerotic dentin in deciduous teeth.

Dentin sclerosis has been regarded as a response to irritation and acts as a mechanism for the protection of the adjacent pulp tissues. Beust[1] emphasized the importance of this protective mechanism by stating that the dental caries resistance of a tooth increases in proportion to the amount of its dentin sclerosis. John Hunter noted in 1839 that as a result of abrasion and in the face of possible exposure of the pulp, the bottom part of the cavity is filled with a new material.[2] Bodecker,[3,4] Kronfeld,[5] Mummery,[6] Vissotzky,[7] Beust,[8-10] Bodecker and Applebaum,[11] Fish,[12] Lefkowtiz,[13] Weider and Mohammed,[14] referred to this material as sclerotic dentin and attributed its formation to the stimuli of caries, age, attrition, abrasion and operative procedures. In 1933 and again in 1934 Warren and co-workers[15] described a roentgen-ray densitometric method of 1 mm. thick planoparallel longitudinal tooth sections which demonstrated that dentin affected by external changes was considerably more radiopaque than normal dentin. All investigators generally agree that the dentin is capable of reaction to stimuli and injuries from without by the formation of sclerosis.[16]

Recognizing the pulp-protective potentiality of dentin sclerosis, the clinician would like to know how its occurrence can be insured and enhanced. It has been demonstrated throughout the years that primary dentin when stimulated will protect itself by sclerosis or hypercalcification. Sowden[17] has gone so far as to state that calcium hydroxide will stimulate the recalcification of carious dentin. Therefore it is logical that a study should be made concerning one of these much discussed factors, namely, the association between the presence of calcium hydroxide methylcellulose used as a base material, and the occurrence of sclerosis of the dentin approximating this base material.

This study was undertaken to illustrate the frequency of the occurrence of dentin sclerosis in deciduous teeth with previous operative treatment, utilizing a calcium hydroxide base material beneath the restoration. The intensity of the dentin sclerosis was measured by instrumental and visual film densitometric determinations of these areas. Histologic examinations of some of the deciduous teeth with and without a calcium hydroxide base were made.

VISUAL SCLEROTIC INDEX

The operative procedures for this study were performed on 75 children in the deciduous and mixed dentition stage. These patients were selected at random from a pedodontic practice. Clinical roentgenograms of 351 deciduous teeth were observed during a time interval of from 4 to 28 months in two groups as follows:

Group A (control teeth) consisted of 160 deciduous teeth restored with amalgam.

Group B (test teeth) consisted of 191 deciduous teeth restored using a calcium hydroxide methylcellulose base material beneath the amalgam restoration.

As a part of the routine office procedure, bitewing roentgenograms were made for diagnosis before any operative procedures were begun. Bitewing films were also obtained at each recall period. Although it is desirable to recall patients at six month intervals, it was found that the recalls on the patients in this study were made at intervals of from four to ten months between examinations. The roentgenograms were examined visually in a semidarkened room using a clinical x-ray viewer. The viewer was masked so that each individual x-ray film fitted into a window of light the size of the film, in order that only the light transmitted through the film was observed. The roentgenograms were examined visually for indications of sclerotic dentin. Sclerotic dentin is defined as an area of increased radiopacity and appears in the dentin film image as an area of relative translucency (white area) close to the cavity floor and sometimes extending toward the pulp. These "white areas" noted visually were found to vary in intensity from tooth to tooth. Therefore, it was possible to classify these variations in dentin sclerosis (sclerotic indices), on the basis of localized areas of film translucency.

The arbitrary visual classification of dentin sclerosis is illustrated in Figure 1. The roentgenogram and drawing illustrate areas of normal dentin at (a) which is used for comparison with the increased roentgenographic density of the sclerotic dentin areas at (d).

Sclerotic Index 1 is an evaluation of a slight increase in roentgenographic translucency which indicates dentin sclerosis of a slight increased localized calcification. It is noted at the axiopulpal wall of the maxillary left second deciduous molar as (1d) (Fig. 1).

Sclerotic Index 2 is an evaluation of a moderate increase in roentgenographic translucency which indicates dentin sclerosis of a moderate increased localized calcification. This is noted at the axiopulpal walls of both the maxillary left first deciduous molar and mandibular left second deciduous molar as (2d) (Fig. 1).

Sclerotic Index 3 is an evaluation of an extreme increase in roentgenographic translucency indicating dentin sclerosis of a maximum increased localized calcification. This is noted at the axiopulpal wall of the mandibular left first deciduous molar as (3d) (Fig. 1).

The cavities in the deciduous teeth in the test group (B) (those containing a calcium hydroxide base material) were generally deep ones in which a cement base ordinarily would be used. The base material used in the test group consisted of a mixture of calcium hydroxide (Eli Lilly and Co. powder No. 40 Lime

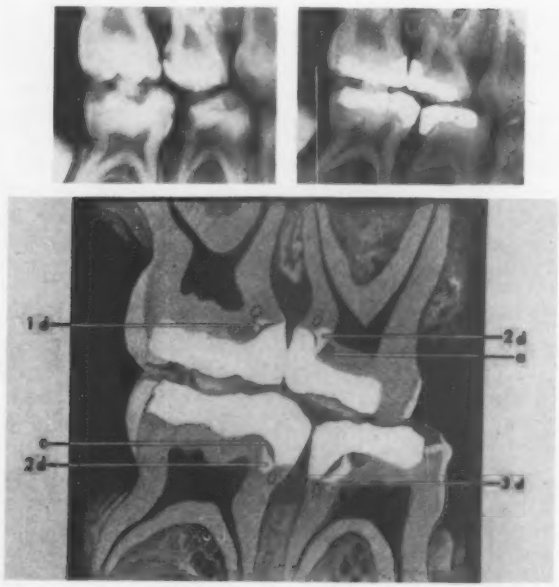

Fig. 1 • Visual densitometric sclerosis index. Above: Preoperative (left) and postoperative (right) views. Below: Postoperative diagram illustrates areas of normal dentin density at (a); sclerotic dentin (d); calcium hydroxide methylcellulose base material (c); sclerotic index 1 (1d); sclerotic index 2 (2d) and sclerotic index 3 (3d)

Slaked) and 1 per cent methylcellulose solution. (The methylcellulose solution was prepared using 0.5 Gm. Cellothyl tablets dissolved in distilled water to make a 1 per cent solution.) The previously prepared powder and liquid was mixed on a glass slab to a creamy consistency immediately before placement as a base for the restoration. This base was placed as a thin layer in the indicated part of the cavity floor and seated with a pledget of cotton. The excess material was removed from the margins and the walls of the cavity with an explorer. In all instances restorations were completed with an alloy filling material.

The bitewing roentgenograms of deciduous teeth without a calcium hydroxide base material (control teeth) and those with a calcium hydroxide methylcellulose base material (test teeth) were compared. The time intervals (in months) between the date when the operative dental work was completed and the dates of the respective follow-up roentgenograms ranged as follows: 99 teeth observed over 20 months, 109 teeth observed between 12 and 20 months, 96 teeth observed between 6 and 12 months, 45 teeth observed between 4 and 6 months and 2 teeth less than four months.

Table 1 summarizes the visual densitometric data which indicate that one tooth exhibited roentgenographic evidence of sclerotic dentin, out of the 160 teeth which were restored without a calcium hydroxide base material in the control group (A). However, of the 191 deciduous teeth in which a calcium hydroxide methylcellulose base was used

Table 1 • Summary of visual densitometric data

Group	No. teeth	No sclerosis	Index 1	Index 2	Index 3
A (control teeth)	160	159		1	
B (test teeth)	191	14	42	72	63

(test teeth group B), 14 teeth did not show roentgenographic evidence of sclerotic dentin. This indicated that 93 per cent of the decidous teeth having a calcium hydroxide methylcellulose base placed beneath an alloy restoration demonstrated sclerotic dentin roentgenographically.

INSTRUMENTAL DENSITOMETRIC EVALUATION

Instrumental densitometric evaluation was accomplished as an attempt to correlate the Visual Sclerotic Index method described with an instrumental x-ray film measurement. It was accomplished by measuring the x-ray film density of dentin sclerosis, of 20 sets of roentgenograms, with a densitometer. These roentgenograms were selected from the original study group of 75 patients to show a comparable number of control teeth and teeth with sclerotic indices of 1, 2 and 3.

Each roentgenogram was placed in an Elwood photographic enlarger with a constant power source and fixed enlarging distance, thus enabling the roentgenograms to be magnified five times the original size (Fig. 2). The film shadow density of the dentin was measured with an Elwood Crystal Densitometer in a darkened room. The opening over the crystal was masked to admit light through a 1 mm. diameter opening. Measurements of the sclerotic area and the immediately adjacent surrounding normal dentin were taken from the projected roentgenographic images (Fig. 1). These areas were selected in order to obtain readings in a tooth, a portion of which is approximately the same thickness as that of the sclerotic area. Similar measurements were also made in the control teeth.

Table 2 is a summary of data denoting a comparison between sclerotic indices and instrumental densitometric measurements arranged according to the absence or presence of a calcium hydroxide base. These measurements indicated that visual estimations and densitometric measurements of unchanged and sclerotic dentin can be correlated as follows:

Control: Increases of calcification of sclerotic dentin ranged from 0 to 20 per cent, with a mean of 2 per cent.

Sclerotic Index 1: Increase of calcification of sclerotic dentin ranged from 0 to 25 per cent, with a mean of 13 per cent.

Fig. 2 • Densitometric measuring apparatus. Constant voltage transformer (A) controls light source of Elwood Photographic enlarger (B). Elwood Densitometer (C) is used to measure density of enlarged film image through its crystal carrier at (D)

Table 2 • Comparison of visual sclerotic index with instrumental densitometric data*

Group	Sclerotic index	No. teeth	Densitometric % difference increased sclerosis	Mean % difference
A (control teeth)		22	0	
		5	3–7	
		1	14	2
		1	20	
B (test teeth)	1	8	1–10	
		13	11–18	13
		4	20–25	
	2	1	15	
		6	25–31	
		18	33–43	38
		6	50	
	3	7	50–52	
		13	55–78	
		3	80–83	70
		4	100	
		2	112–125	

*The range of percentage difference noted between the average instrumental density reading in the unchanged and in sclerotic dentin areas in the same tooth with the mean percentage difference for each index.

Sclerotic Index 2: Increase of calcification of sclerotic dentin ranged from 15 to 50 per cent, with a mean of 38 per cent.

Sclerotic Index 3: Increase of calcification of sclerotic dentin ranged from 50 to 125 per cent, with a mean of 70 per cent.

HISTOLOGIC EVALUATION

The data obtained from visual inspection and densitometrically from roentgenograms of deciduous teeth with a calcium hydroxide base material show increased density of the dentin or dentin sclerosis in the areas between the base material and the pulp. Since this is a microscopic observation and it is known that tissue changes take place only on a microscopic level, it was important that representative histologic sections of these same teeth be examined. Dentin in unaffected teeth was compared microscopically with dentin found beneath the alloy restorations with and without calcium hydroxide base material.

Twenty of the deciduous teeth used in this study were extracted for histologic evaluation. Ground sections were prepared along planes longitudinal and horizontal to the occlusal surfaces, to show sclerotic dentin between the cavity bases and the tooth pulps, when noted in the clinical roentgenogram. The tooth enamel was removed with diamond stones and disks, and the crown was shaped into a block of dentin. A roentgenogram was made of this block to localize further the sclerotic dentin area for preparations of the section to be studied. On completion of the dentin block and its roentgenogram, the block was further reduced to a ground histologic section using levigated alumina slurry in water as the grinding compound on a flat plate glass slab. These sections ranged from 20 to 60 microns in thickness. On reaching the appropriate thickness the sections were polished on an Arkansas stone using water as the wetting agent. This polishing action removed the slurry particles used for grinding.

One section studied was from the lower left second deciduous molar obtained from a girl ten years of age. Original clinical examination of the molar noted mesioocclusodistal caries involvement not requiring the use of a base material for restoration. All caries was removed, and an MOD cavity preparation was completed with an alloy restoration. Seventeen months later a part of the distolingual cusp was noted to be fractured and involved cariously (Fig. 3,a). A distoocclusal preparation was completed and all caries was removed. No pulp exposure was noted, although the cavity can be classified as a near exposure at the distoaxiopulpal wall. A calcium hydroxide base material was placed at that region and the alloy restoration completed. Roentgenographic examination at the time of removal of the tooth, 11 months after the distal restoration was completed (Figure 3,b), indicated a large area of the sclerotic dentin,

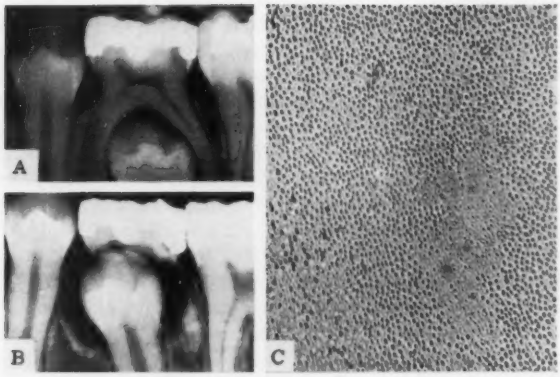

Fig. 3 • A: Clinical view showing distolingual caries. B: Sclerotic index of 3 is noted beneath distoocclusal replaced restoration with calcium hydroxide base 11 months postoperatively. Original mesio-occlusal restoration without base material shows no evidence of sclerosis 28 months postoperatively. C: Note irregular dentin in high-power photomicrograph of sclerosed dentin in distoocclusal area

with a sclerotic index of 3, in the area of the calcium hydroxide base material. The mesioocclusal restoration exhibits no evidence of sclerosis after being in place 28 months.

Histologically a horizontal ground section through the crown to the tooth, at the level just occlusal to the pulp horns, was studied. Microscopic low-power examination revealed that the mesial cavity preparation was in primary dentin with the dentin tubules in this area cut in cross and tangential section. There was evidence of secondary dentin noted in this area which was fairly regular. At the margins of the distal cavity, the region in which extreme sclerosis was noted roentgenographically, the dentinal tubules were seen mostly in cross section. There was an extreme reduction in the number of dentinal tubules in this area in comparison to other areas of the section. This was noted as very irregular dentin in Figure 3,c, which is a high-power photomicrograph of the distal area.

The sclerotic dentin areas seen roentgenographically beneath the calcium hydroxide methylcellulose base material cannot be correlated with the histological sections of these teeth. Microscopic examinations show that this area of roentgenographically evident sclerosis is very irregular sclerotic dentin characterized by a diminution of dentinal tubules, with an increased amount of dentin matrix. These changes could have occurred as a result of age, caries, or cavity preparation.

The practical clinical application of this information is that a calcium hydroxide methylcellulose base material should be used in deciduous teeth cavity preparations when indicated after all caries has been removed, and in all probability in permanent teeth preparations. Kronfeld[18] states that the dentin of deciduous teeth is structurally identical with that of the permanent teeth, except that it is thinner in keeping with the smaller size of the deciduous teeth. The production of sclerotic dentin and its enhancement by the use of a calcium hydroxide base material would be of value in protecting the pulp tissue from fluids (Fish[12]) and dental caries (Beust[1] and Bodecker[19]).

DISCUSSION

From time to time there have appeared, in the dental literature, claims as to the recalcification of carious dentin. Sowden[17] in 1956 restored 4,000 teeth with deep carious lesions. After the gross amount, but not all of the caries, had been removed, calcium hydroxide was placed in the base of the cavity followed by an amalgam restoration. He observed what he called "a recalcification" of the carious dentin beginning pulpally and progressing occlusally. In all probability this recalcification of carious dentin is not actually a recalcification process, but sclerotic dentin being formed as a response on the part of the injured dentin beneath the carious region. In the present study all carious dentin was removed previous to placing the calcium hydroxide base material. There is no doubt that the "white area" seen roentgenographically beneath the base material was an area of sclerosis of the existing dentin and not an area of recalcification of carious dentin.

The clinical phase of this study represented many variables which were difficult to control adequately. During the operative procedures it was not feasible to control the depth of the cavity because of the differences of extent of dental caries in each tooth. This problem evolved itself more prominently in selecting an adequate control for this study. It should be realized that the control teeth cavity preparations usually were not as deep as those containing a calcium hydroxide base. The clinical decision of whether or not a base material should be used in a cavity may depend on a difference in depth of as little as 0.5 mm. An ideal control would be a cavity preparation of the same depth; however, placing an alloy restoration without a base material where one is indicated would not be good clinical dental practice. To overcome somewhat this situation, patients were selected containing both control and test teeth. Differences in the depth of the cavity preparations between control and test teeth could introduce an appreciable error.

The arbitrary classification of Sclerotic Index 1, 2 and 3 by viewing the roentgenograms brings attention to the factor of human error. This factor is of importance only to the point to which the data are to be used. It is of primary interest to know whether or not calcium hydroxide base material affects the production of sclerotic dentin and also whether the material enhances this phenomenon. In this study, the presence of the calcium hydroxide base material is consistently associated with roentgenographic evidence of sclerotic dentin, about which there is no error.

A general indication of the range of intensity of the calcification of sclerotic dentin is presented. The instrumental densitometric data show that dentin beneath the calcium hydroxide base material may represent increased calcification as high as 125 per cent. The data therefore show sufficient evidence, considering all factors, to support the belief that calcium hydroxide base material clinically affects and enhances the production of sclerotic dentin.

The application of an accurate measuring device such as the Elmwood Densitometer to measure clinical roentgenograms leaves much to be desired. The errors over which there is no control are due to the technic used. No attempt was made to standardize closely the exposure time, focal distance, developing technic and angle of exposure. Actually, under clinical operating conditions this would be an improbable task. Another factor of extreme importance in roentgen-ray densitometry is the variable thickness of tooth structure the rays must penetrate. Since each deciduous tooth varies in thickness, the comparison of one part of a tooth with another or with different teeth can provide only relative measurements. Despite these variable conditions of meas-

urement, the over-all results give an indication of the degree to which dentin sclerosis is stimulated by calcium hydroxide. Plans have already been formulated to investigate this problem further and more accurately in the laboratory by utilizing microradiographic technics of some of the sections in this study. It is hoped that the location and degree of dentinal calcification may be determined more precisely by this technic.

SUMMARY

Seventy-five children in the early mixed dentition stage with operative dental work completed on 351 deciduous teeth were observed from 4 to 28 months, with periodic bitewing roentgenograms taken at intervals of from 4 to 10 months. These patients had 191 deciduous teeth in which a calcium hydroxide methylcellulose base material was used beneath the alloy restoration (test teeth) and 160 deciduous teeth in which no base material was utilized beneath the alloy restoration (control teeth). Roentgenographic examinations indicated that 93 per cent of the test teeth containing a calcium hydroxide base material showed evidence of dentin sclerosis beneath the area of the base material. Ninety-nine per cent of the deciduous teeth without a calcium hydroxide base material (control teeth) indicated no roentgenographic evidence of sclerosis.

A densitometric evaluation was made of the bitewing roentgenograms of 115 deciduous teeth utilizing the Elwood Densitometer. The results of this roentgenographic densitometric evaluation indicate a localized increase of dentin sclerosis ranging from 0 to 20 per cent in the control teeth and from 0 to 125 per cent in teeth containing a calcium hydroxide methylcellulose base material (test teeth).

Histologic examinations of ground sections were made of 20 teeth. The sections indicated that the sclerotic areas seen roentgenographically beneath the calcium hydroxide base material could not be correlated with the histologic picture.

From the results of this research it is apparent that a calcium hydroxide methylcellulose base material is effective in the production of sclerotic dentin in deciduous teeth. There is no doubt that the "white area" seen roentgenographically is an area of sclerosis of the existing dentin and not an area of recalcification of carious dentin.

CONCLUSIONS

From the data obtained in this study, the following conclusions were drawn:

1. Calcium hydroxide methylcellulose base material stimulates and enhances the production of sclerotic dentin in deciduous teeth.

2. It can be assumed that dentin sclerosis, which appears as a white area roentgenographically, is a hypercalcification of the existing primary dentin, and not a recalcification of carious dentin.

1958 Lord-Chaim Dental Research Prize Paper, New York State Dental Society.

This paper is a summary of the thesis submitted to the Faculty of the Graduate School of Dentistry as partial fulfillment of the requirements for the M.S.D. degree, Indiana University, March 25, 1958. The complete data are contained in the original thesis, which is available in the library of Indiana University School of Dentistry.

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1. Beust, T. B. Resistance to caries. J. D. Res. 11:619 Aug. 1931.

2. Fliegel, S. L., and Feldman, H. G. Secondary dentin in deciduous teeth. Columbia D. Rev. 11:3 May 1940.

3. Bodecker, C. F. Fundamentals of dental histology and embryology. New York, Macmillan Co., 1926, p. 49.

4. Bodecker, C. F. Concerning the character of the age changes in enamel and dentin and their relation to the vital dental pulp. J. Am. Col. Den. 9:380 Dec. 1942.

5. Kronfeld, Rudolf. Histopathology of the teeth and their surrounding structures. Philadelphia, Lea & Febiger, 1939, p. 67.

6. Mummery, J. H. Microscopic and general anatomy of the teeth, ed. 2. London, Oxford University Press, 1924, p. 236.

7. Vissotzky, I. A. Formation of "irregular" dentine. Tufts D. Outlook 19:8 June 1945.

8. Beust, T. B. Reactions of the dentinal fibril to external irritations. J.A.D.A. 18:1060 June 1931.

9. Beust, T. B. Dental histology and embryology. Philadelphia, W. B. Saunders Co., 1934, p. 57-61.

10. Beust, T. B. Posteruptive changes in the maturation of teeth. J.A.D.A. 28:2186 Nov. 1931.

11. Bodecker, C. F., and Applebaum, Edmund. Metabolism of the dentin; its relation to dental caries and to the treatment of sensitive teeth. D. Cosmos 73:995 Oct. 1931.

12. Fish, E. W. Physiology of dentine and its reaction to injury and disease. Brit. D. J. 49:593 June 1, 1928.

13. Lefkowitz, W. "Vitality" of the calcified dental tissues. V. Protective metamorphosis of the dentin. J. D. Res. 21:423 Oct. 1942.

14. Weider, S. R.; Schour, Isaac, and Mohammed, C. I. Reparative dentine following cavity preparation and fillings in the rat molar. Oral Surg., Oral Med. & Oral Path. 9:221 Feb. 1956.

15. Warren, S. L., and others. Quantitative method of studying roentgen-ray absorption of tooth slabs. Am. J. Roentgenol. 31:663 May 1934.

16. Schour, Isaac. Calcium metabolism and teeth. Illinois D. J. 8:360 Sept. 1939.

17. Sowden, J. R. Preliminary report on the recalcification of carious dentin. J. Den. Children 23:187 3rd Quart. 1956.

18. Kronfeld, Rudolph. Dental histology and comparative dental anatomy. Philadelphia, Lea & Febiger, 1937, p. 195.

19. Bodecker, C. F. Lipin content of dental tissues in relation to decay. J. D. Res. 11:277 April 1931.

New faces for old

Benjamin E. Bahn, D.D.S., Roxbury, Mass.

The necessity of taking photographs of children in need of orthodontic treatment is a foregone conclusion. A pictorial record not only shows the malaligned teeth, it records other defects such as a weak chin, pouty lips, soft muscles about the nose, and creases around the mouth. This record cannot be obtained with plaster models of the teeth alone. It is best seen through the eye of the camera, which misses none of the details of the teeth and the lips in their proper relation to the face in general.

Fig. 1 • Close-up taken with the Polaroid Land camera

The only difficulty the orthodontist has in getting these pictures is that when using conventional photography, he has to wait until his roll of film has been developed and printed to know what results he has achieved. Sometimes it can take several weeks. He may have to take pictures of new patients each week until his roll of 20 pictures is used up. Then he must wait several more days while they are developed and printed to be returned for further study. There may be pictures which must be retaken to get the fine details he was anxious to record, as, for instance, in the case of protruded upper teeth, or the spaces between the upper and lower arch, or any other peculiarities which a specific case might present.

The entrance of the Polaroid Land camera in the field of photography has given the dentist and the orthodontist a method of securing pictures before, during, and after treatment. Great detail can be shown in these pictures—even those taken by an inexperienced photographer. And best of all he can examine the picture at the same visit when it is taken.

I have been using the Model 80A Polaroid Land camera for quite some

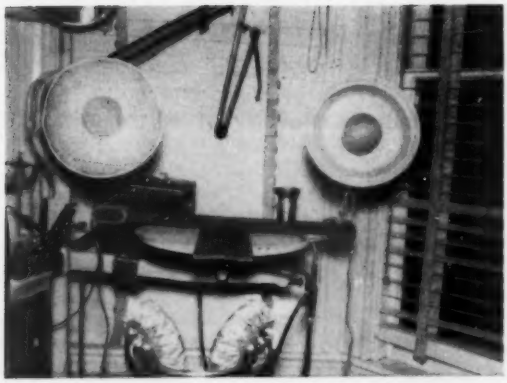

Fig. 2 • "T" shaped board for flood lamps and camera

time for orthodontic photography. I have a simple lighting arrangement: a photoflood bulb (No. 2) placed on each end of a three-inch-wide wooden strip about 21 inches long. The bulbs are screwed into a clamp socket holder that can be turned in any direction on a ball and socket joint. The clamp socket can be purchased at any electrical supply store. Another three-inch board is set at right angles to the center of the light board, forming a "T." The patient places his chin on a white towel over the end of this board and an identification card is placed under his lip. The camera is placed at the angle of the "T" between the lights. Thus the focus is always perfect.

I use two plastic cheek retractors to hold the mouth open for the picture. It is important to have the patient close his eyes to avoid the brilliance of the photoflood lamps. A white background is best.

On the Model 80A I use a No. 15 shutter opening with a No. 3 close-up lens. The camera is placed about 13 inches from lens to the patient's teeth. Distance is set at No. 6.

The lights are switched on and the picture is taken looking directly over the center of the camera lens. The viewfinder at this range will give a distorted, off-center image. The camera must be placed on the center of the lighting "T." The exact setting can be checked with the steel tape that is supplied with the Polaroid Close-up Lens Kit.

It is of paramount importance to a busy orthodontist to be able to have a picture available at the same sitting, and, of course, to get one that is perfect. With the Land camera if the first picture is not satisfactory, another one can be taken on the spot.

A collection of these pictures taken before and after treatment may help patients realize what modern technics and procedures can do for their particular problem. It can give them confidence in their dentist and a sense of satisfaction in what has been achieved.

429 Blue Hill Avenue

Experimental study of acute ulcerative stomatitis

Joseph D. Berke, D.D.S., Mexico D.F., Mexico*

Acute ulcerative stomatitis was produced and transmitted in dogs, and the lesions were studied histologically. The bases of these ulcers have a dense network of spirochetes that attack the epithelium and penetrate the retes and the underlying connective tissue. Most of the spirochetes demonstrated in the periodontal tissues of dogs infected with acute ulcerative stomatitis have the characteristics of Borrelia.

Fusospirochetal infections are common in the human mouth and respiratory tract. In acute ulcerative stomatitis the interdental papilla is attacked, creating the characteristic foul odor and necrotic lesion. At times, the ulcer may be seen near or under bridges, in the retromolar region, and the palate. The average infection runs a course of one to three weeks, and usually does not distress the patient greatly. Severe infections show involvement of the lymph glands, especially in the submaxillary triangle and the tonsils. The predisposing causes of these infections have been listed as disturbances of nutrition, previous viral infection and poor hygiene. In clinical practice, it is not uncommon to find patients of good hygienic habits, well nourished and otherwise in good health, displaying such a pathologic condition.

Smears of healthy human mouths generally disclose the presence of spirochetes. In periodontal disease, and especially in acute ulcerative stomatitis, spirochetes are seen in great abundance.[1] Fusospirochetal infection was orginally attributed to a mixture of microorganisms including *Borrelia vincenti,* a short delicate spirochete. The coexistence of fusiform bacilli was considered essential.

More than 50 years ago, Veszpremi[2,3] produced lesions in rabbits by subcutaneous inoculation of infected matter from human mouths and lungs. Attempts to produce fusospirochetal abscesses by isolating the microorganisms of such exudate and the subcutaneous injection of combinations of such cultures in guinea pigs, rats and rabbits, have met with varied success. Whole exudate yielded most consistent results. Microorganisms found included several species of spirochetes, fusiform and other bacilli and many forms of cocci.

Kritchewski and Seguin,[4] in 1920, identified three species of spirochetes but they found no *B. vincenti* in these lesions. They emphasized the importance of the presence of white and greening staphylococci. Smith,[5] in 1930, included a gram-negative motile vibrio in mixtures of streptococci and spirochetes and reported the transmission of typical fusospirochetal infections in mice and guinea pigs. The spirochete was identified as *Treponema microdentium.*

Proske and Sayers,[6] in 1934, using many combinations of cultures taken from fusospirochetal infections of the

lungs, produced typical lesions that were transmissible in guinea pigs. *T. microdentium*, *T. mucosum*, *T. macrodentium*, *T. buccale*, and a culture of fusiform bacilli, in which *Borellia vincenti* developed, were among the anaerobes described. Mixtures that included a streptococcus, vibrio, spirochete, and a fusiform bacillus were invariably potent.

In a series of carefully controlled experiments, Rosebury and others,[7,8] in 1950, reported the transmission of fusospirochetal disease in guinea pigs by the inoculation of exudate from human material but could not produce typical lesions from cultures made from such samples. They isolated 17 distinct growths that included fusiform rods, motile rods, gram-negative and gram-positive rods, streptococci and spirochetes. No combination of these cultures produced the characteristic infection. No virus could be demonstrated in fusospirochetal exudate. This was contrary to the findings of Black,[9] 1942, who believed that these lesions were primarily caused by a virus.

MacDonald and others,[10,11] 1956, also isolated 17 species of microorganisms from exudate. Only four cultures obtained from such sources were needed to produce typical infections in guinea pigs; two strains of *Bacteroides*, an unidentified motile germ-negative anaerobic bacillus and a diptheroid. The spirochetes were found to be nonessential in these infections as were the fusiformis, vibrios and anaerobic streptococci.

PRESENT STUDY

In the present study, typical acute ulcerative stomatitis was observed in the mouths of dogs. These fusospirochetal infections were incidental to experiments on the reaction of the teeth and investing tissues to the forces transmitted by orthodontic appliances. The infection was directed to the interdental papilla and showed the distinctive necrosis seen in humans. As the dogs bit their fur, matted hair packed between and about the orthodontic bands and arches and provided an ideal cover for anaerobic growth. Fusospirochetal infection was seen in six dogs and was successfully transmitted to more than ten others. None of the animals was more than one year old.

The expression "clean as a hound's tooth" is a truism in young healthy dogs. There is very little debris about the teeth. The small amount of matter that can be stained in smears shows mycelial forms and epithelial cells but very few cocci, bacilli and spirochetes. In smears of acute ulcerative stomatitis in dogs, the spirochetes are in such predominance that their presence as a primary factor cannot be discounted. Comparatively few fusiformis and other bacteria are seen.

Figure 1,A, exhibits acute ulcerative stomatitis in an experimental animal. The arch and thick pad of matted hair have been removed. The infection, directed to the interdental gingiva, caused necrosis of the crests of the papillae. Figure 1,B, is a photograph of the maxillary incisors of another dog infected with matter from the mouth of the dog seen in Figure 1,A. These necrotic, bleeding lesions were observed 48 hours after transmission. Figure 1,C, shows an isolated lesion in another dog also infected from the dog shown in Figure 1,A. There has been destruction of the interdental papilla and the gray sloughed pseudomembrane is evident.

The nature of acute ulcerative stomatitis was studied best in histologic sections. The truncated papillae showed pronounced infiltration of leukocytes with some destruction of the more superficial fibers of the periodontium. In infections of long duration, the outer wall of the gingival crevice was attacked and there were detachment and pocket formation. A most susceptible site for characteristic lesions was the interdental gingiva where space closure followed tooth extraction.

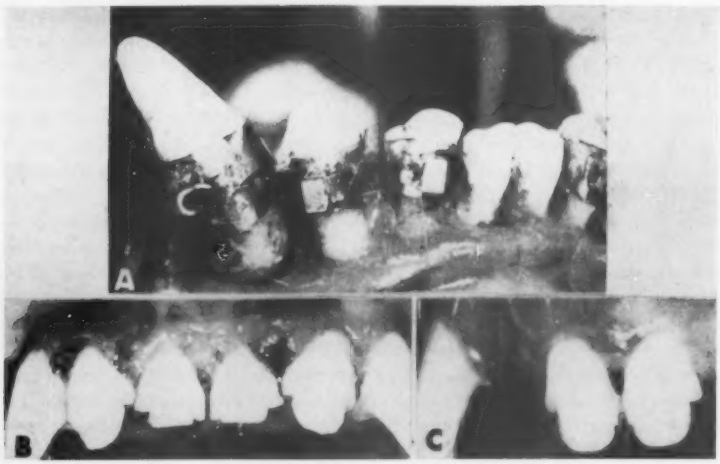

Fig. 1 • A: Acute ulcerative stomatitis in dog used in orthodontic experiments. Arch and matted hair have been removed. Truncated interdental papillae is evident. B: Acute ulcerative stomatitis transmitted from animal seen in A. Bleeding, infected gums can be seen. C: Isolated area showing acute ulcerative stomatitis transmitted from infection seen in A. Truncated interdental papilla and pseudomembrane are evident

Because of the consistent prevalence of spirochetes in all of the smears of the infected animals, it was felt that the histologic study should be concerned primarily with the demonstration of the existence and distribution of these microorganisms in the lesions. The stain used was devised by Dionisio Nieto,[12] of the Instituto de Estudios Médicos y Biológicos and is remarkably effective in the demonstration of spirochetes in tissues. Decalcified segments of maxilla and mandible were embedded in celloidin and cut at 15 microns. Thinner sections are not recommended because the celloidin must be removed before staining and there are numerous transfers. The uranium nitrate used in this technic subdues the silver staining of cellular elements.

The interdental gingiva of an infected animal is seen in Figure 2. The ulcer is clearly outlined by the dark stained masses of spirochetes covering and invading the tissues. A thick pseudomembrane consisting of bacterial aggregations, pus and desquamated epithelial cells is superimposed. The early bacterial attack is directed to the epithelium, destroying the thinner areas and penetrating the retes. There is variation in the width and depth of the lesions of acute ulcerative stomatitis. However, the characteristics of these ulcers are constant.

The dark stained layer of spirochetes at the base of an ulcer is seen in higher magnification in Figure 3. The larger and thicker microorganisms form a dense network near the surface of the infected tissue. Strands of bacterial masses extend into the epithelial retes and the underlying connective tissue. Greater detail is seen in Figure 4. The smaller forms frequently can be found deeper in the connective tissue. The spirochetes follow the interstices of the fibrous elements of the gingiva and periodontal membrane. As seen in Figure 5, there is considerable variation in the size of the spirochetes. Because of their manner of distribution

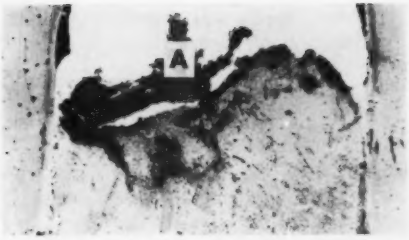

Fig. 2 • Photomicrograph showing interdental gingiva of dog exhibiting acute ulcerative stomatitis. The deep ulcer is protected by the pseudomembrane (A)

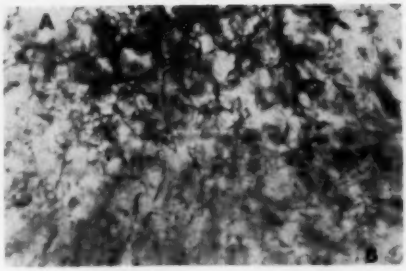

Fig. 4 • Photomicrograph showing detail of dense network of spirochetes extending from base of ulcer into deeper tissues. A: Area near surface. B: Subepithelial stroma

Fig. 3 • Higher magnification of ulcer showing dark spirochetal masses at base attacking epithelium. A: Pseudomembrane. B: Zone of deeply stained spirochetes. C: Epithelial rete. D: Subepithelial stroma

in the lesion and the adjacent tissues, it is not unlikely that the difference in form and size may be due partly to the presence of less mature forms and mutations. Some of the spirochetes observed show beading of one end. Since the Nieto stain requires a specimen of not less than 15 microns, the orientation of the microorganisms in the thickness of the histologic section creates this optical phenomenon. Many of the spirochetes are loosely wound and compare to the accepted specifications of *Borrelia*.

Study of the exudates of these lesions by means of phase contrast microscopy disclosed intense bacterial activity in the cytoplasm of pus cells. There was a predominance of monocytes and only occasional polymorphonuclear leukocytes. Bacteria seen in the cytoplasm included many forms, especially small vibrios and

Fig. 5 • Spirochetes in stroma of interdental papilla. Variation in morphology can be seen

spirochetes. It was found that if the monocytes were sufficiently vital there was an eruptive expulsion of some of the vibrios through the cell membrane and the bacteria continued their extremely active movement outside of the cell. Most frequently, there was rupture of the cell membrane with apparently explosive force. In other instances, there was rupture of the nuclear membrane and the nuclear elements diffused throughout the cytoplasm. Often there was cessation of bacterial activity after the rupture occurred. The bacterial activity observed in these cells was of such magnitude that exposures of less than one twenty-fifth of a second were unsuccessful in stopping the action.

DISCUSSION

Turner[13] classified the spirochetes into three groups: *Treponema, Borrelia* and *Leptospira. Treponema* included *T. pallidum, T. carateum, T. pertenue, T. microdentium* and *T. macrodentium.* The latter two are human and animal saprophytes which are found in the mouth and can be grown on artificial media. *Borrelia* differ from *Treponema* and *Leptospira* by being longer and having more loosely wound spirals. They are not readily grown on artificial media. *B. recurentis* is the spirochete of recurrent fever, but the other members of this group like *B. vincenti,* which is seen in the debilitated tissues of humans, may be variants of one species rather than different entities.

The inability to cultivate these microorganisms in artificial media may be the salient point in the divergence of reported data included in the bibliography. No doubt MacDonald and others[11] produced subcutaneous abscesses almost identical in many ways to fusospirochetal infection without including spirochetes in the combinations of cultures used. However, acute ulcerative stomatitis as observed in dogs is basically a spirochetal infection. A further study will attempt a critical classification of these microorganisms.

SUMMARY

Acute ulcerative stomatitis was produced and transmitted in dogs. The lesions had all of the characteristics of the disease as observed in humans. By means of histologic study of the infected tissues, it is now proved that the bases of these ulcers have a dense network of spirochetes that attack the epithelium, penetrating the retes and the underlying connective tissue. With the extension of the infection there is destruction of the fibrous elements of the periodontium with detachment and further necrosis of the gingiva. Most of the spirochetes demonstrated in the periodontal tissues of dogs infected with acute ulcerative stomatitis have the characteristics of *Borrelia.*

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1. Hemmens, E. S., and Harrison, R. W. Studies on anaerobic bacterial flora of suppurative periodontitis. J. Infect. Dis. 70:131 March-April 1942.

2. Veszpremi, D. Kultur—und Tierversuche mit dem Bacillus fusiformis und dem Spirillum. Centralbl. Bakt., I Abt. Originale 38:136 1905.

3. Veszpremi, D. Züchtungs—und Tierversuche mit Bacillus fusiformis, Spirochaete gracilis und Cladothrix putridogenes. Centralbl. Bakt., I Abt. Originale 44:332, 408, 515 1907.

4. Kritchewski, B., and Seguin, P. Spirochetosis bacales-reproduction experimentale et traitement. Rev. de Stomatol. 22:41 1920.

5. Smith, D. T. Fusospirochetal disease of lungs produced with cultures from Vincent's angina. J. Infect. Dis. 46:303 April 1930.

6. Proske, H. O., and Sayers, R. R. Pulmonary infection in pneumoconiosis. Pub. Health Rep. 49:839 July 20, 1934.

7. Rosebury, T., and others. Studies of fusospirochetal infection. J. Infect. Dis. 87:217 Nov.-Dec. 1950.

8. Rosebury, T., and others. Studies of fusospirochetal infection. J. Infect. Dis. 87:234 Nov.-Dec. 1950.

9. Black, W. C. Etiology of acute infectious gingivostomatitis (Vincent's stomatitis). J. Pediat. 20:145 Feb. 1942.

10. MacDonald, J. B.; Sutton, R. M., and Knoll, M. L. Production of fusospirochetal infections in guinea pigs with recombined pure cultures. J. Infect. Dis. 95:275 Nov.-Dec. 1954.

11. MacDonald, J. B., and others. Pathogenic components of experimental fusospirochetal infection. J. Infect. Dis. 98:15 Jan.-Feb. 1956.

12. Nieto, D. In Manual of neurohistologic technique. Oscar Turner, ed. St. Louis, C. V. Mosby, 1940, ch. 10, p. 53.

13. Turner, T. B. In Bacterial and mycotic infections of man, ed. 3. Rene Dubos, ed. Philadelphia, J. B. Lippincott, 1958, ch. 26.

Roentgenographic periodontal indicator paste

Frank J. Kratochvil, Jr., D.D.S., Kensington, Md., and Robert W. Longton,† D.M.D., Norfolk, Va.*

Increasing attention is being directed toward periodontal pathology. Considering the strides made in recent years concerning diagnosis, treatment and maintenance of the periodontal structures, it appears that a more thorough means of diagnosis is necessary to determine the extent of pathological changes.

A roentgenographic indicator will add to the information revealed by the usual intraoral survey. Goldman and Cohen asserted:[1] "It should be understood that the films must show the complete tooth and its attachment apparatus with a minimum of quantitative and qualitative distortions." It seems proper to provide a material of moderate opacity, but not to a degree to obscure the anatomy. It must be opaque enough to record changes from the normal in soft tissue.

The problems as they now exist are well defined by this quotation from I. Glickman:[2] "The radiograph may be considered an aid in the location of periodontal pockets, because it indicates the distribution of the areas of bone loss. However, valid influences can not always be drawn regarding the location and extent of periodontal pockets as suggested by the distribution of bone loss revealed radiographically."

The methods used in the past, such as the insertion of gutta-percha points[3] and calibrated silver points,[4] have been cumbersome and limited in complete mouth roentgenograms. They show only individual points in selected places, not a complete tissue outline.

METHOD

The requirements of a roentgenographic indicator are radiopacity, ease of manipulation, suitable consistency, tissue tolerance and ease of removing after roentgenographic procedure.

Roentgenographic examination can correlate the soft tissue with respect to the hard tissue when a suitable indicator paste is placed into pathologically deepened sulci and tissue voids. A roentgenographic reference is established for both presurgical and postsurgical evaluation of soft tissue in relation to tooth and bone structure.

Various compounds were evaluated, such as iopanic radiopaque tablets, barium sulfate with glycerine, barium sulfate and glycerine with silver alloy, silver alloy in disclosing wax, and silver alloy-impregnated pressure indicator paste. The latter is composed of silver alloy and pressure indicator paste,[5] 50 per cent of each by volume.

A carrier is essential to place the indicator paste. A Caulk impression syringe with disposable plastic tip is very satisfactory. By means of the syringe, indi-

Figure 1

cator is directed beneath the gingiva, with gentle pressure to locate the limits of sulci and tissue voids. Two tips are necessary for correct indicator placement. These should be beveled at a 45 degree angle, one left and one right. Each tip may be used on four quadrants—the opposite beveled tip to be used on the mirror image quadrant. The longest dimension of the tip of the bevel should be placed against the tissue side of the sulci to create a space and to carry the paste to the greatest depth of tissue attachment. The excess indicator is removed from the clinical crown and outer surface of the gingiva with a plastic instrument, cotton swab, or with two-by-two inch gauze, so that the roentgenographic image records the correct gingival height.

Bitewing roentgenograms with facial placement of indicator paste, followed by a second bitewing roentgenogram with lingual placement, will yield most of the necessary information. However, a complete mouth survey with indicator paste in place is highly recommended.

Figure 2

OBSERVATIONS

Figure 1 is a roentgenogram showing silver alloy paste in place. The upper left second molar with the uneven silver outline of the tissue attachment can be noted. This illustrates the shape of the periodontal lesion in the buccal region. The various depths of pockets are seen. Of particular interest are the irregular depth and contour of pockets as contrasted to an unreal situation which might be assumed by manual probing and mistaken interpretation by practitioners who are not full-time periodontists.

In Figure 2 a point of interest is the fact that the depth of the epithelial attachment between the second bicuspid and the first molar does not follow the resorbed bone level as might be assumed and interpreted from a conventional roentgenographic survey.

Figure 3 represents a complete mouth survey using silver alloy indicator paste on the facial side to give the doctor an over-all picture of pathological conditions of the entire periodontal structure.

Figure 4 is the conventional complete mouth roentgenographic survey of the same patient as a comparison of the relative merits of the diagnostic value of these two types of roentgenographic surveys.

DISCUSSION

The complete mouth roentgenographic survey using silver alloy and indicator paste shows the continuity of the soft tissue as contrasted with the method of using occasional gutta-percha or calibrated silver points. The silver alloy gives the true outline of each pocket and empha-

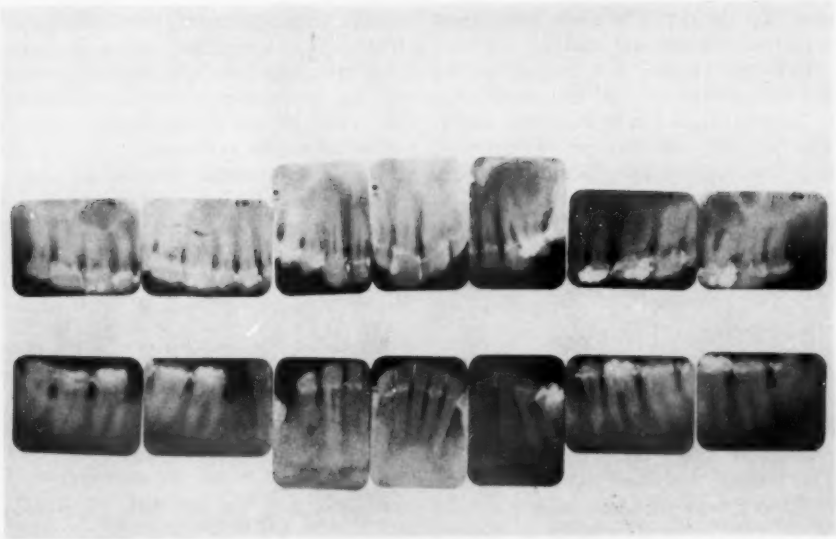

Figure 3

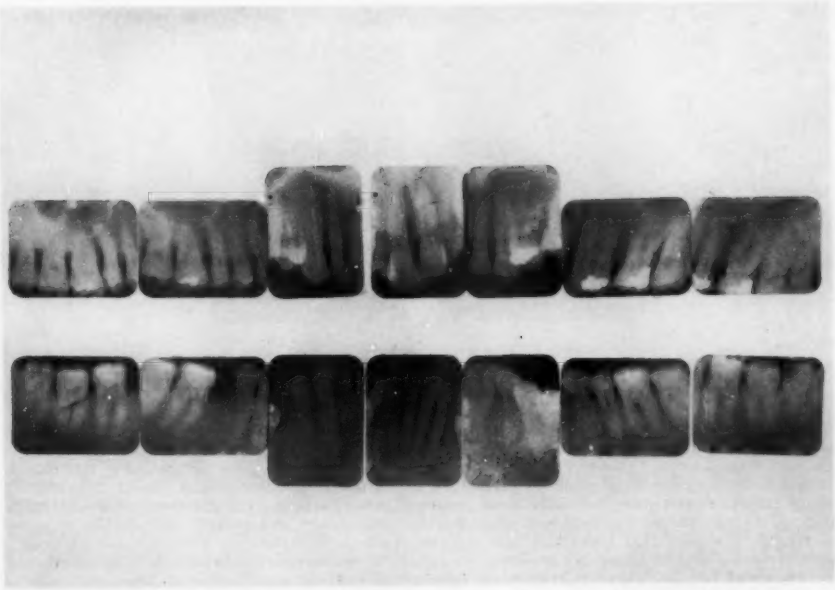

Figure 4

sizes that the depth of tissue attachment is highly irregular and uneven.

Evidence of bone loss due to local or systemic irritations and its relationship to the soft tissues can be evaluated better. The varying relationships of increased bone loss and shallow pockets and deep pockets or both, and little bone loss, as described by Glickman,[2] can be recognized more easily and evaluated more properly.

SUMMARY

A method has been presented to show roentgenographically the depth, size and contour of periodontal lesions by injecting radiopaque silver alloy indicator paste. The method described is to use a paste of 50 per cent soft disclosing wax and 50 per cent silver alloy which is injected into the sulci by means of a syringe. A roentgenographic survey is made immediately after placement of the radiopaque material. This method shows up pathological conditions without obliterating natural landmarks and without lessening the value of the roentgenogram for all other diagnostic purposes.

The paste is easily removed by means of a stream of water and air from the operating unit syringe.

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The opinions or assertions contained in this article are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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1. Goldman, H. M., and Cohen, D. W. Periodontia, fourth edition. C. V. Mosby Co., 1957.

2. Glickman, I. Clinical periodontology. W. B. Saunders Co., 1958.

3. McCall, J. O., and Wald, S. S. Clinical dental roentgenology. W. B. Saunders Co., 1957.

4. Hirschfeld, L. A calibrated silver point for periodontal diagnosis and recording. J. Periodont. 24:94 April 1953.

5. Mizzy, Inc., Clifton Forge, Va.

Basic Research • Despite some recent effort toward improvement, there is no reason to alter the earlier conclusion that our present social environment does not favor the development of an understanding of science, or of science's aims and needs. The increasingly spectacular practical achievements of science have only accentuated misconceptions about the relative significance, for the growth of science, of practical results and the advancement of basic knowledge. To many people physical science means nuclear energy and rockets. The public is sometimes led to expect that biological and medical research will conquer every human ailment—will overcome death. There is a tendency to equate scientific progress with a sum of money and a number of people. There is insufficient appreciation of the significance of basic research, or of the conditions in which it can flourish. *AAAS Committee on Science in the Promotion of Human Welfare. Science and Human Welfare. Science 132:69 July 8, 1960.*

Something different in uniforms

Harry Cimring, D.D.S., East Beverly Hills, Calif.

Raya Rachlin's understandable pride stems from the knowledge that she is today the only one of her kind in the United States. She is one of four women from as far apart as Texas and Pennsylvania who form one of the most exclusive quartets in the country. They are the only four women to have served as dentists in the Armed Forces; two in the Navy during World War II, one in the Army since then, and one in the Air Force currently.

Although first to serve in the Armed Forces of the United States as a woman dentist, Dr. Krout was technically commissioned in the WAVES and not in the Dental Corps. She entered the Navy as a Lieutenant in 1944 and performed active duty at the Great Lakes Naval Training Station for almost two years. In addition to her routine dental work, she presented clinics on denture construction and participated in a research program conducted by the 9th Naval District.

Raya Rachlin

Sara G. Krout

Dean of the group is Sara G. Krout of Chicago. She was born in Riga, Latvia, and received her dental degree there, serving in a Red Cross dental unit toward the close of World War I. At war's end she came to the United States, attended the University of Illinois College of Dentistry and secured a dental license in that state. She has been in private practice in Chicago ever since.

Since the war she has been on "ready reserve" status with the Evanston Dental Unit of the USNR, performing duties parallel to those of her fellow unit members as well as extracurricular assignments such as lecturing to WAVES. In 1950 she was promoted to Lieutenant Commander and in 1955 to Commander.

Dr. Krout has been active on the staff

Alice Tweed

Helen E. Myers

of the Women and Children's (Mary Thompson) Hospital of Chicago, in the Asthmatic Children's Aid Society, on the women's executive committee of the Office of Superintendent of Public Instruction of the State of Illinois (during World War II), and in various dental societies as well as the Association of Military Surgeons. In her spare time she paints.

Her husband is Maurice H. Krout, Ph.D., a prominent psychologist; her daughter is Johanna K. Tabin, Ph.D., also a psychologist, and her son-in-law is Julius Tabin, Ph.D., an atomic scientist.

Following closely in Dr. Krout's footsteps was Alice Tweed (of the Arizona Tweed family, well known in orthodontics), now of Texas. She, too, served almost two years on active duty from 1944 to 1946, her post being the San Diego Naval Hospital, doing general operative dentistry. She entered the service as a Lieutenant (j.g.) and was discharged a Lieutenant. She has not practiced dentistry since her marriage to J. D. Peak, a dentist. They live in Austin.

Helen E. Myers of Pennsylvania is the only woman dentist to serve in the Army. From the time she was graduated from Temple University (1941) until she was commissioned a Captain in 1951, she campaigned for the right of women to serve. Even during the war emergency there were no provisions for women dentists to do so. By 1951, however, legislation was enacted and regulations changed so that women could be accepted in the Dental Corps. Technically, Dr. Myers is the first woman commissioned as a dentist in the Dental Corps of the United States Armed Forces.

Dr. Myers' career is a tightly interwoven triad of aviation, dentistry and the military. Her interest in dentistry undoubtedly derived in part from her dentist father, but also from her passion for flying and the need for an independent income to finance it. Perhaps her battle to become the Army's first woman dentist is a sublimation of her campaign to allow women into military aviation.

After interning in oral surgery in Philadelphia, she located in Lancaster, Pa., and has practiced there ever since, except for her stint in the service. She now limits herself to exodontics and prosthodontics, as well as operating her own laboratory.

On Sundays she and her retired father conduct a "rocking chair" dental practice on the open porch of her Pennsylvania Dutch grandfather's dairy farm at Christiana amidst the chattering of squirrels and blue jays.

Her stretch in the Army was distinguished by one unique characteristic—she insisted on attending the officers' orientation program and participating in crawling the infiltration course. She also saw overseas service in Trieste and Japan. On the boat to Europe she fashioned a denture for one of the seamen with ship's tools and materials picked up in Naples.

Most of Dr. Myers' spare time has been devoted to aviation—from her own Piper Cruiser and Culver Cadet in the 1940's through courtesy flights in military craft while in the service, and up to the present with the Lancaster Civil Air Patrol. She feels that her career in dentistry, in military service and in aviation have helped to implement the credo of the International Soroptimist Association of which she is a member:

"To promote a universal spirit of friendship and service as being conducive to international peace."

There is today only one woman dentist on active duty with the Armed Forces. She is Dr. Rachlin, serving until recently in Athens, Greece, and after that in Italy, having gone on active duty with the Air Force Reserve in January of 1954. Dr. Rachlin is a general practitioner and was graduated from Howard University in 1952. Originally educated in Germany, she worked as a dental technician in Shanghai, China, as well as in the United States. Dr. Rachlin, now a Captain, speaks five languages in addition to a smattering of Italian, a fact making her foreign tour of duty doubly enjoyable.

Both Dr. Myers (Major, Inactive Army Reserve) and Dr. Rachlin (Captain, Active Air Force Reserve) maintain that they have asked for no special consideration because they are women, and have received none. The rules and regulations of the three services preclude such consideration. However, there are some differences that should be kept in mind. One military bulletin puts it this way: "the dentist most desired by the military is one who is career minded, and marriage tends to divert the female officer to family pursuits. Pregnancy requires mandatory discharge from the service. If she is married and the husband is also in service, joint assignments to the same base are not always possible. Finally, female applicants may not have dependents under age 18. Furthermore, in the Navy, women dentists are not assigned to duty on board ships or with units of the Fleet Marine Force."

Women, understandably, wear uniforms different from those of male dental officers. They are similar to those of the WACS, WAVES and WAFS.

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Radiation Dosage • It is generally accepted, though not proven, that there is no dosage level below which radiation becomes harmless. It is assumed that any increase in radiation, whether natural or man-made, will carry with it some increase in damage, even though this damage may not be detectable even in the most elaborate statistical studies. Even where the damage is fairly calculable . . . there is no special point at which it suddenly becomes clear that drastic measures are called for to prevent any further increase. Roughly 40 thousand Americans die in auto accidents every year, a fact which leads no one to recommend that automobiles be outlawed. What is done is to formulate standards for drivers, for highways, and for the cars themselves to keep the level down to a point which society seems to be willing to accept and, further, to minimize the death rate below the acceptable level. *Science in the News. Science 131:1656 June 3, 1960.*

Simplified oral physiotherapy or gingival home care

Armen Z. Mesrobian, D.M.D., Waltham, Mass.*

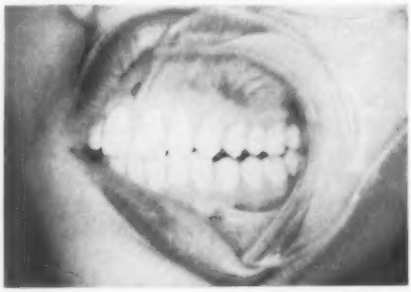
Oral physiotherapy means toothbrushing, interdental stimulation and massage of the gingiva as part of the home care given by the patient to his gums, as contrasted to office care furnished by the dentist. Also included under this heading are the use of raw foods as tooth detergents and gingival stimulating foods at the end of meals such as carrots, cabbage, celery and apples, and then finally, the careful rinsing of the mouth with water.

The reasons for these procedures are (1) to remove irritating food debris and to retard the formation of deposits; (2) to aid the periodontal blood and tissue fluid circulation (a generally accepted assumption), and (3) to stimulate the keratinization or thickening of epithelial protection of these tissues.

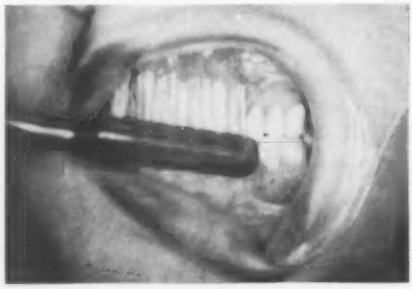
On the basis of office records, over 70 per cent of my periodontal patients have tried faithfully to carry out their home care instructions over a period of years. However, about 85 per cent of these people had at least some difficulty in using the toothbrush beneficially. Indeed, after months of training, some were unable to do one side as well as the other, depending mostly on whether they were right or left handed. Therefore it was necessary to adopt a very simple, yet effective, method of gingival stimulation for most of these patients as shown in the accompanying pictures. Any acceptable method will be satisfactory so long as a majority of patients can master it.

METHOD OF GINGIVAL STIMULATION

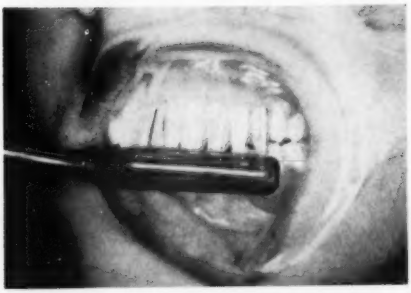
The following method has proved successful for patients with average manual dexterity:



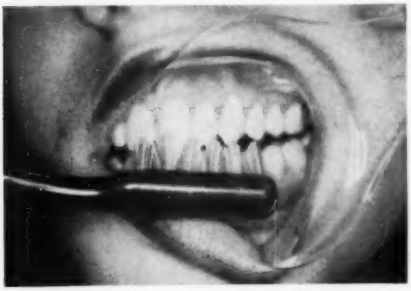
A representative region to be given oral physiotherapy with a toothbrush.



Step 1 • The brush is placed with the side of the bristles flat against the attached gingiva, and the handle parallel to the occlusal surfaces; the side of the bristles is pressed firmly against the gums.



Step 2 • The brush is moved along the attached gingiva to the marginal gingiva.



Step 3 • As the brush moves onto the tooth surfaces, it is rotated slightly to about 45 degrees and the stroke continued until the entire facial or lingual surface has been passed over with the brush.

To use the interdental stimulator, the side of the rubber tip is placed gently along the interdental papilla. A rotary motion is used against the papilla. The point of the stimulator must not be forced into the gingiva or openings forced in the interdental gingiva where none existed previously.

The occlusal surfaces are simply scrubbed with a slightly rotary and forward and back movement of the bristle points. Many dentists advocate this simple and effective method.

Usually a medium textured natural bristle toothbrush in a two row arrangement with a rubber tip interdental stimulator is used.

If the physiotherapy is to be effective, the dentist must first remove the deposits and treat the gingival disease. Also the patient should begin home care very gently one day after deep scaling and curettage or three days after the removal of the gingivectomy pack. Thereafter, the patient must carry out the procedure immediately after meals to remove debris as well as to stimulate the gingiva. Generally, the more time spent on its careful repetition, the better the results. Naturally, it is the correct use of the toothbrush that is important; however, recent histochemical researches[1] on the increased consumption and beneficial influence of oxygen in inflamed tissues seem to indicate a rationale for the utilization of an oxygenating agent as a useful aid to the toothbrush.

SUMMARY

Oral physiotherapy plays a tremendously important part in the correction of periodontal disease and in the maintenance of healthy tissues in such individuals.

In order to be mastered and employed faithfully, the method must be simple as well as safe and effective.

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1. Behrman, S. J.; Fater, S. B., and Grodberg, D. L. Evaluation of oxygenating agents in treatment of gingival inflammations. J. D. Med. 13:195 Oct. 1958.

Dental caries prevention in Japan

M. Murase, D.D.S., Tokyo

About one hundred years ago the Europeanization of Japan began. As the standard of living in Japan has risen, so has the rate of dental caries, to approach that found in European countries. Many people in Japan are deeply interested in caries prevention, today one of the most prevalent diseases.

Among the most frequently used preventive measures being taken are improved oral hygiene, and the early discovery and treatment of caries. In spite of the earnest efforts of dentists in the schools, the caries attack rate has continued to rise, especially since the end of World War II, because of the change to a European type of diet, with increased sugar consumption.

To intensify the fight against caries, the Japan Society for Dental Caries Prevention has been organized, with the following officers: chairman, Professor T. Kono, department of oral surgery, Faculty of Medicine, Tokyo University; managing director, Professor M. Murase, department of oral surgery, Tokyo Women's Medical College; directors: Professor F. Ninomiya, Kyushu Dental College; Professor H. Fukada, Faculty of Dentistry, Nippon University; Professor M. Takeuchi, Tokyo Dental College; Professor S. Matsumiya, Tokyo Dental College; Professor T. Ueno, Tokyo Medico-Dental University; Professor T. Niwa, Nippon Dental College; Professor T. Matsumura, Faculty of Dentistry; Osaka University; Professor Y. Yagyu, Osaka Dental College, and Professor Y. Imagawa, Tokyo Medico-Dental University; councillor, Professor G. Minoguchi, department of stomatology, Faculty of Medicine, Kyoto University.

The society aims to initiate new methods of caries prevention, including (1) the fluoridation of public water supplies and (2) the administration of fluoride tablets to persons living in areas where it is impossible to fluoridate the water.

Water fluoridation is the most desirable caries-preventive measure, but there are instances in which technical or economic considerations make fluoridation impossible. Moreover, two thirds of the Japanese people live in areas where water is not supplied through a central water works.

Japan's first experiment with the fluoridation of water was initiated at Yamashina, Kyoto, in 1952; 0.6 ppm of fluorine was added to the water. Favorable results in the prevention of caries were noted, with no discernible harmful effect on the inhabitants.

An experiment with fluoride tablets was begun in January 1946, with three groups of about 3,500 school children in Kyoto. Each group of children was provided daily school lunches, supplemented by fluoride tables containing 0.5, 1.0 and

1.5 mg. of fluorine, respectively. The experiment indicated that the administration of fluoride tablets prevented caries to some extent, with no harmful effects whatever. Today, more than 80,000 Japanese children are receiving fluoride tablets.

The Japan Society for Dental Caries Prevention intends to propagandize in behalf of water fluoridation, to answer technical and scientific questions relating to fluoridation, and to analyze the various sources of drinking water in Japan to determine the natural fluorine content.

It is unreasonable to add 1.0 ppm of fluorine uniformly to all drinking water. Japan has a latitudinal extent of 15 degrees, and there are significant regional differences in temperature and precipitation. In Japan, in the southern regions the dosage of fluorine can be less than in the northern regions.

In areas where there are no central water supplies, the society is recommending the prescription of fluoride tablets; the dosage is based on the amount of natural fluorine present in the local water.

The society also acts to inform the public about the causes of dental caries, means of prevention and treatment, and other subjects relating to dental health.

Tokyo Women's Medical College

The Scientist • The complexity of the scientist's nature must account for his being considered mildly interesting and colorful. He is thought to be very valuable to society and to derive very great personal satisfaction from his work. If one were to study his recreational habits one would find him most frequently at chess, rarely playing bridge, and never playing poker.

In summary, there emerges a picture of the scientist as a highly intelligent individual devoted to his studies and research at the expense of interest in art, friends, and even family. The scientist derives great personal satisfaction, a sense of success, reasonably high status in the community, and a modest income from his work. He serves mankind in a selfless way, almost unaware that he is doing so; he serves others by serving himself. *David C. Beardslee and Donald D. O'Dowd. The College-Student Image of the Scientist. Science 133:998 March 31, 1961.*

100 years of British dental surgery

Sir Wilfred Fish, C.B.E., London, England*

The Royal College of Surgeons of England has been celebrating a centenary, not of the College itself, but of the L.D.S., R.C.S. (Dental Surgeon) diploma. It is just over 100 years since Queen Victoria granted the Council of the College, which was already an examining body in general surgery, a Royal Charter permitting them to examine persons desirous of being so examined and to issue certificates of fitness to practice dentistry.

It was to this College in its not so prosperous days of the middle of the last century that the pioneers of dental surgery applied for a special diploma to be established, obtainable by examination conducted by the College: a diploma that should be a hallmark of proficiency in dental surgery, an art which they regarded as a specialty of general surgery. Their request was received with mixed feelings, for the College was by no means disposed to accord recognition to any kind of specialists at all.

Through an error in tactics, or perhaps force of circumstance, these pioneers brought about a state of affairs that was the exact opposite of what they intended. They wanted to make dentistry a branch of medicine, whereas in fact they established a separate profession; for the very Charter whose centenary was celebrated in 1959, while it provided for an examination in dentistry to be held by the Royal College of Surgeons and for the granting of a diploma (the L.D.S., R.C.S.), also decreed that the diploma should not qualify its holder to be entered on the new Medical Register set up by the new General Medical Council under the Medical Act of 1858.

CROSS CURRENTS, CONFUSION

It is no wonder that this led to cross currents and confusion. Here was a separate profession whose members could not be registered on the Medical Register but which, nevertheless, was controlled as to entry by the College of Surgeons. Of course, some of the dentists became Members of the College in addition to obtaining their dental license, but it was some years before the separate College of Dentists was disbanded (in 1863) and its members absorbed into the society of those who had taken the L.D.S. of the Royal College of Surgeons.

It will, of course, be asked how such a muddle could be resolved. The answer is that it took nearly a century to straighten it out and that it got worse before it got better. When at length, in 1878, registration of dentists was established, the care of the Separate Register was also put under a medical authority. (Actually the Register was compiled and maintained by the General Medical Council.) So dentistry, though separate, was not yet independent. In 1921 a Den-

tal Board was set up (still under the tutelage of the General Medical Council), but at last, in 1956, a separate and autonomous General Dental Council was established and the dental profession is now statutorily not only separate but also quite independent.

DENTISTRY'S GAIN

So much for the confusion and cross purposes; what did dentistry gain from its association with the Royal College of Surgeons and how has the association benefited those whom dentistry serves? An apprenticeship of 100 years is of no small assistance in learning the art of living and self-government. Dentistry has learned that the only way for any surgical art to progress is by concentrating on the basic sciences, and this has become established practice in dental education. So ingrained has the lesson become that the Nuffield Foundation was prevailed upon to establish scholarships for those more brilliant dental students who wish to take up an academic career. By this means they are able to interrupt their dental studies and take a bachelor's degree in science before they complete their clinical course in dentistry. This has been amazingly beneficial to dental education and research and has already produced some fine teachers, a number of whom occupy professorial chairs. It is an experiment well worth noting.

Another benefit of the profession's long apprenticeship with the College of Surgeons is that dentists are constantly reminded of the essentially surgical nature of their work. The symposium at the Centenary Celebrations, which were held from July 22 to 24, 1959, was on the cleft palate, and included a survey of both developmental factors and of the prosthetic, orthodontic and surgical procedures involved in its treatment; a perfect combination of basic science, dentistry and surgery.

GREATEST BENEFIT

But perhaps the greatest benefit of all is that English dentistry is now so closely associated with the College in this widespread brotherhood of surgery that has grown up as one of the traditional benefits of our great Commonwealth of Nations.

Fourteen years ago, our apprenticeship over, we were taken on as junior partners. We got our own faculty and our own fellowship. Four years ago the Dental Faculty set up a research department of dental science to investigate the prevention of dental disease. The Odontological Museum, also established in 1859, now lies adjacent to the great Hunterian collection in the magnificent new buildings in Lincoln's Inn Fields that have risen Phoenix-like from the ashes of the old burnt College that lay in ruins in 1941. The Fellowship in Dental Surgery is already known throughout the world, and last year our examiners traveled to Ceylon to hold a primary examination for the F.D.S., R.C.S. in conjunction with the primary for the F.R.C.S.

There is much to be said for such a partnership, and at the Centenary Festival Dinner, Lord Hailsham, in congratulating the dental profession on its hundredth birthday, commended to us the need for more research and the desire of the Government that our efforts to encourage it should be successful. There is something to be said for administrative independence; indeed no profession would, in the long run, willingly submit to anything less, but in the unity of close association there are tremendous possibilities, and there is much to be said for the old apprenticeship system.

*President, General Dental Council, London; dean, Faculty of Dental Surgery, Royal College of Surgeons of England, Lincoln's Inn Field, London, W.C.2, England.

I. L. Voda
NEW MEXICO

C. G. Johnson
CONNECTICUT

G. J. Perdigon
FLORIDA

C. C. Connelly, Sr.
MISSOURI

1961

State Dental Association Presidents

C. F. Carstensen
IOWA

D. W. Melarkey
NEVADA

I. L. Voda is president of the New Mexico Dental Association. A general practitioner in Las Vegas, Dr. Voda attended the New Mexico Highlands University for two years, and received a D.D.S. degree in 1937 from the Washington University School of Dentistry. He is a charter member and a past president of the Santa Fe District Dental Society, an associate member of the Albuquerque District Dental Society, and holds membership in the American Society of Dentistry for Children, New Mexico Society of Dentistry for Children, International College of Dentists, Pierre Fauchard Academy, Howard Riley Raper Study Club, Masons, Scottish Rite, Shrine, Elks and Rotary clubs, Eastern Star, and B'nai B'rith. Married, Dr. Voda is the father of three children—Hal M., 18; Lynne, 16, and Alan M., 11. Photography and bowling are among Dr. Voda's hobbies.

Clifford G. Johnson is president of the Connecticut State Dental Association. A general practitioner in Newtown, Dr. Johnson received a D.D.S. degree from the School of Dental Medicine, Tufts University, in 1930. He is a member of the Western Fairfield County and the Danbury Dental societies, Rotary Club and the Masonic Order. From 1931 to 1936 Dr. Johnson served as clinical instructor at Columbia University School of Dental and Oral Surgery; since 1952 he has been a lecturer at the Fones School of the University of Bridgeport. Dr. Johnson is the father of three—C. Terry, 23; Emmy W., 20, and Mary E., 15. Golf is his chief hobby.

Gustave J. Perdigon, president of the Florida State Dental Society, a prosthodontist in Tampa, received his D.D.S. degree in 1933 from the Loyola University (New Orleans) School of Dentistry. He is a past president of the West Coast District Dental Society and the Southeastern Academy of Prosthodontists, and a member of the American Denture Society, American Equilibration Society, Tampa Chamber of Commerce, Exchange Club, University Club of Tampa, Tampa Yacht Club and the Palma Ceia Golf and Country Club. Dr. Perdigon is the author of two articles on prosthetic dentistry which appeared in the *Journal of Prosthetic Dentistry*. He is a Fellow of the American College of Dentists and the International College of Dentists, a diplomate of the American Board of Prosthodontics, a member of the American Dental Association's Council on Dental Trade and Laboratory Relations, and a member of Omicron Kappa Upsilon and Delta Sigma Delta. Dr. Perdigon is married and the father of three—Margaret Jane, 24, Gustave J., III, 21, and George Lee, 18. His chief hobby is golf.

Cecil C. Connelly, Sr., president of the Missouri Dental Association, is a general practitioner in St. Louis. He attended LaGrange College, and received a D.D.S. degree from St. Louis University Dental College in 1921. A past president of the St. Louis Dental Society and the St. Louis Dental Science Society, Dr. Connelly is a Fellow of the American College of Dentists and the International College of Dentists, and a member of the Pierre Fauchard Academy and Omicron Kappa Upsilon. He is a member of the Protestant Episcopal Church, a staff member of Deaconess Hospital and is active in various civic organizations. Dr. Connelly is married and the father of two children—C. Clayton Connelly, Jr., 30, a dentist, and Patricia W. Becker, 28. Hobbies of Dr. Connelly include numismatics, fishing, flower gardening, and Boy Scout work.

Clarence F. Carstensen, a general practitioner in Waverly, is president of the Iowa Dental Association. Dr. Carstensen graduated from the Wartburg College, Waverly, Iowa, in 1925, and received a D.D.S. degree from the State University of Iowa College of Dentistry in 1930. Dr. Carstensen has held all offices in the North Central District Dental Society. He is an associate member of the Chicago Dental Society and a member of the Waterloo (Iowa) Dental Society. He is a member of the Lutheran Church Men's Brotherhood, Waverly Chamber of Commerce, Lions Club, Toastmasters Club and the Waverly Country Club. Dr. Carstensen is married and the father of two—David Arthur, 23, and John Robert, 21. Golfing, hunting and bowling are Dr. Carstensen's chief hobbies. For many years he served as a member of the local library board.

David W. Melarkey is president of the Nevada State Dental Society. Dr. Melarkey received a B.S. degree in 1942 from the University of Nevada and a D.D.S. degree in 1946 from the School of Dentistry, College of Physicians and Surgeons, San Francisco. A general practitioner in Reno, Dr. Melarkey is a past president of the Nevada State Board of Dental Examiners and the Washoe County Dental Association. He holds membership in the Pierre Fauchard Academy, Psi Omega and Tau Kappa Omega fraternities, Sigma Alpha Epsilon and the Elks Club. Dr. Melarkey is the author of several articles in *Contact Point*. He has lectured at the University of Nevada. He is past chief of the dental staff, Washoe Medical Center Hospital, and present chief of the dental staff, St. Mary's Hospital. Dr. Melarkey is a member of the board of directors of the American Cancer Society. Married, Dr. Melarkey is the father of three children—David, Jr., 12, John, 10, and Timmothy, 6. His hobbies include hunting, skiing, golf, home movies, playing the organ, swimming and diving.

Hypnosis and the personality of the operator

Irving I. Secter, D.D.S., M.A., and Donahue L. Tremaine, Ph.D., Chicago*

A paper, by Borland and Epstein, entitled "Psychological Evaluation of Hypnosis" appeared in the January 1961 issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION. The first paragraph ended with the following statement:

"The results indicated that most well-adjusted dentists do not tend to use hypnosis." This interpretation was based on an investigation, the methodology and conclusions of which are questioned in the following.

Results contradicting the quoted statement have been reported in a study by Irving I. Secter.[1] In his study, the Minnesota Multiphasic Personality Inventory (MMPI) was administered to 48 subjects (32 physicians, 12 dentists and 4 psychologists). The MMPI is one of the most widely used inventories, both clinically and experimentally. It is highly regarded for its comprehensiveness. It enables investigators to distinguish readily between pathological groups (undifferentiated) on the one hand, and normal persons on the other.

Thus far various items of the inventory have been selected and grouped to form separate scales for the scoring of nine personality traits. These are: hypochondriasis (Hs), depression (D), hysteria (Hy), psychopathic deviate (Pd), masculinity-femininity interest (Mf), paranoia (Pa), psychasthenia (Ps), schizophrenia (Sc), and hypomania (Ma).

The subjects in the Secter study fell into two groups as shown in Table 1.

The MMPI profiles (test results) were examined and analyzed by Dr. Donahue L. Tremaine. The profiles of the hypnosis-users were indistinguishable from the profiles of those who did not use hypnosis in their profession.

MMPI scores are considered normal when ranging below T = 70. One score above the critical point (T = 70) is not uncommon in "normals." The majority of the MMPI profiles, in this study, had clinical scores that were below T = 70. The distribution of subjects having one clinical score of 70 or over is shown in Table 2.

Table 1 • Occupation of subjects and experience as hypnotists

Occupation	Experienced as hypnotists	Not experienced as hypnotists
Physicians	17	15
Dentists	6	6
Psychologists	2	2
Total	25	23

Table 2 • Subjects with one score of 70 or above

Personality trait*	D	Pd	Pa	Ma
Experienced as hypnotist	1	1	1	4
Not experienced as hypnotist	4	1	1	4

*See text for key to abbreviations.

There were only three subjects whose profiles showed two clinical scores of 70 or above. These profiles were obtained from the group of subjects who were not experienced in the use of hypnosis. The personality traits involved in these two-score combinations are shown in Table 3.

Profiles with two scores above 70 are not common in the population at large. That is to say, the probability that personality maladjustment might be found on psychiatric examination of subjects with two-score combinations, would be greater than in the case of those having only one score of 70 or above.

None of the profiles had more than two scores above 70. The results of the analysis do not indicate that either group of subjects is clearly different in regard to psychological adjustment. In this study, at any rate, if the adjustment of any group was suspect, it was in the group of nonhypnosis users.

Table 3 • Number of two-score combinations among subjects not experienced as hypnosis users

Personality trait*	Number
Hs and Hy	1
Hs and D	1
Hs and Ma	1

*See text for key to abbreviations.

DISCUSSION

There are several factors which may reflect on the value of the Borland-Epstein (BE) study. The authors attempt to infer causality from statistical correlationships without adequately controlling many confounding variables. Their conclusion could have been reached by a simple process of deduction. Assuming that most dentists are well adjusted or "normal" and assuming that as yet only relatively few dentists use hypnosis, it would follow that there is a statistical relationship between dentists who are well adjusted and those who do not use hypnosis. It would be erroneous, however, to infer maladjustment from the use of hypnosis. It would be equally illogical to state that dentists who are white or who are male or who were educated in the United States do not tend to use hypnosis.

The authors of the BE study started out with strong expectations of what the study would reveal. It is possible that such a bias may have affected the selection of subjects, which was not done by random selection. The control subjects were chosen on a highly selective basis and there is considerable doubt as to the accuracy of the "matching" with the experimental groups. The probabilities are that the subjects in the BE study are not representative of the dentist population. Interpretations must therefore be limited to the sample studied. Conclusions would not be applicable to dentists generally. Furthermore, the small number of subjects was reduced to five categories of personality types, each too small to justify generalizations to all dentists. Additionally, errors in computation, as yet unaccounted for, appear in the study as demonstrated in Table 4.

The BE study started out with 17 hypnosis users and 17 nonhypnosis users. The results, however, were reported with totals of 13 hypnosis users and 22 nonhypnosis users as shown in Table 4. The total number of subjects and their distribution was at variance with the number reported originally. One wonders if four of those in group 2 belong in the opposite column. If this were true, there would be

Table 4 • Summary of hypnosis users and nonhypnosis users in BE study

	Hypnosis users	Nonhypnosis users
Group 1	3	3
Group 2	0	10
Group 3	2	2
Group 4	4	4
Group 5	4	3
Total	13	22

no demonstrable difference between any of the sub-groups reported.

SUMMARY

Data were analyzed from personality inventories administered for purposes other than to identify the personality of the subject (the Secter study). It was found that a group of physicians, dentists and psychologists who used hypnosis was generally indistinguishable in regard to "normalcy" from a similarly constituted group which did not use hypnosis. Forty-four out of forty-seven (one profile was not available for study) in both groups were identified as normal. These data probably approximate more closely the true adjustment status of dentists using hypnosis than the finding of ten well adjusted out of 34, as inferred from the BE study.

CONCLUSION

Differentiating, on the basis of personality factors, between groups of dentists who use hypnosis and those who do not use hypnosis is not justified on the basis of the data from the more rigidly controlled Secter study. This conclusion probably applies to the BE data as well.

7407 West Irving Park Road

*Clinical psychologist, associate professor of psychology, Roosevelt University.

1. Secter, Irving I. An investigation of hypnotizability as a function of attitude toward hypnosis. Unpublished master's thesis, department of psychology, Roosevelt University. Sept. 1959.

Meaning of Happiness • We fall into the error of thinking that happiness necessarily involves ease, diversion, tranquility—a state in which all of one's wishes are satisfied. For most people happiness is not to be found in this vegetative state but in striving toward meaningful goals.

The dedicated person has not achieved all of his goals. His life is the endless pursuit of goals, some of them unattainable.

He may never have time to surround himself with luxuries. He may often be tense, worried, fatigued. He has little of the leisure one associates with the storybook conception of happiness.

But he has found a more meaningful happiness. The truth is that happiness in the sense of total gratification is not a state to which man can aspire. It is for the cows, possibly for the birds, but not for us. *Life Magazine. The National Purpose. John W. Gardner. Chicago Daily News June 25, 1959.*

XIII International Dental Congress to be held in Cologne, Germany, July 1962

Fédération Dentaire Internationale

By the time this issue of THE JOURNAL reaches some readers the 1961 annual session of the Fédération Dentaire Internationale will have been concluded. The accomplishments of the Finnish dentists and especially the Organizing Committee will go down in F.D.I. history as another fine achievement.

Finland's four and a half million people are not limited to just a few examples of such leadership. Their dental education, their high type of professional endeavor and their work in various fields of research are all integral parts of a dental program of which the Finns are justly proud. The dental profession owes a debt of gratitude to the dentists of Finland and to the republic of Finland itself.

Dentistry's thoughts now turn to the XIIIth International Dental Congress to be held in Cologne, Germany, July 7-14, 1962. Every fifth year this International Dental Congress, sponsored by the Fédération Dentaire Internationale, draws essayists, clinicians, and research workers to a common center where their work is demonstrated to thousands of dentists from all parts of the world. The last such Congress was held in Rome in 1957 with more than 10,000 dentists in attendance.

From all indications, hundreds of American dentists plan to go to Cologne for the 1962 Congress. If you are laying such plans, be sure to keep up your F.D.I. membership by sending in your 1962 dues as soon as you receive your dues notice in October. You save $5.00 on your enrollment fee at Cologne by having your 1962 supporting membership in F.D.I. before December 31, 1961. If you and your wife plan to attend the Congress, you save another $10.00 by enrolling in the F.D.I. before December 31, 1961.

Similar arrangements should be made relative to travel. This Congress comes during the peak of tourist travel and requests should be made early to hold reservations for the dates contemplated. You may wish to contact the F.D.I. travel consultant, C. W. Carrick, Oberlin Bank Bldg., Oberlin, Ohio, for travel information. Dr. Carrick can help with plans for individual travel or for tours planned to fit in with the Congress.

For any further information, contact O. H. Moen, F.D.I. National Treasurer for the USA, 6 Main St., Watertown, Wis.

Be sure to watch your F.D.I. Newsletter for programs and suggestions.

Association staff members: your national servants

DIRECTOR, BUREAU OF LIBRARY AND INDEXING SERVICE

Donald A. Washburn, director and librarian of the Association's Bureau of Library and Indexing Service, assumed his present post in 1949. He received a B.A. degree in 1938 from Albion College, a D.D.S. degree in 1941 from Northwestern University Dental School, and a B.L.S. degree in 1946 from the University of Chicago. After graduation from dental school, Dr. Washburn practiced dentistry in Chicago. From 1946 to 1948 he served as bibliographer with the Quartermaster of the U.S. Army in Chicago, and in the following year served as research consultant and assistant research librarian at John Crerar Library in Chicago.

The Bureau operates the Association's library of 12,000 volumes and maintains an indexing service for dental literature. The Association's library was formally organized in 1927. One of its services most used by dentists is the "package library" service. More than 1,700 package libraries—each consisting of a collection of 20 to 40 reprinted articles and clippings on a particular subject—have been compiled. Each year, package libraries on about 700 subjects are loaned to between 1,500 and 2,000 dentists and others interested in dentistry. The circulation of books ranges above 3,700 annually.

The library's collection of periodical literature includes more than 780 journals and other publications. This number includes about 200 dental journals (mostly in foreign languages) from 50 countries abroad; all are available for loan.

In cooperation with the Council on International Relations, the Bureau acts as a clearing house for sending dental literature abroad. In the past year, for instance, 3,897 books and periodicals have been sent to recipients in 11 countries.

The Bureau also has the responsibility for maintaining the archives of the Association, collecting documentary material of historical interest to the profession, and developing uniform standards of dental nomenclature. The Bureau sponsors national conferences on library operations and dental nomenclature. Finally, the Bureau prepares the *Index to Dental Literature*.

Dr. Washburn has served on many committees of the Medical Library Association and is convention chairman for 1962 of that organization. He also is a member of the Special Libraries Association and the Chicago Dental Society. He has served on the board of education of Bremen Community High School. He is married and has four children.

ASSISTANT LIBRARIAN

John Cedrins joined the Association staff in 1956 as assistant librarian. He is in charge of acquisitions and cataloguing, and is periodical librarian. He also provides reference service, including the compilation of lists of books and periodicals.

Dr. Cedrins formerly was on the staff of the libraries of the University of Chicago, where he received his Master's degree in library science. He holds a Ph.D. degree from the University of Bonn, Germany, and formerly taught in the junior college at Flensburg, Germany.

Dr. Cedrins is a member of the Medical Library Association. He is married and the father of two daughters.

REFERENCE LIBRARIAN

Miss Otilia D. Goode joined the Association staff in 1960 as reference librarian in charge of the package library collection, Bureau of Library and Indexing Service.

Donald A. Washburn

John Cedrins

A native of North Carolina, Miss Goode obtained an A.B. degree from Greensboro College, Greensboro, N.C., in 1928, and an A.B. in library science from the Woman's College of the University of North Carolina in Greensboro, in 1931. She spent six years teaching foreign languages in the schools of North Carolina, and from 1935 to 1949 served as hospital librarian for the Veterans Administration in five states. From 1949 to 1955 she was medical librarian in the Veterans Administration Hospitals in Washington, D.C., and Wood, Wis. From 1955 to 1960, Miss Goode was reference librarian in charge of the package library service of the American Medical Association, Chicago.

In her present position, Miss Goode compiles new "packages" as needed for the Bureau of Library and Indexing Service. She prepares bibliographies on specified subjects, and answers reference and research requests from Association members, staff members and persons in associated fields of activity.

INDEXER, BUREAU OF LIBRARY AND INDEXING SERVICE

Miss Martha Mann began work on the *Index to Dental Literature* in 1926 for the American Dental Association. She assumed supervision of indexing work for the Bureau of Library and Indexing Service in 1946. To date, 30 volumes of the *Index*, covering the literature from 1839 to 1960, have been published. The *Index* in quarterly form is available on a subscription basis. Annual volumes may be purchased separately. The Bureau also prepares the annual indexes for THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION and for DENTAL ABSTRACTS.

Born in Green Bay, Wisconsin, Miss Mann lived in Illinois, Missouri, New York and Canada in early years. She graduated from Lyons Township High School, LaGrange, Ill., and later attended Northwestern University School of Journalism.

In addition to her indexing work, Miss Mann provides a translation service in the romance languages for the Central Office. She is a member of the Fourth Presbyterian Church, the Pan American Council of Chicago and the U.S. Uruguay Alliance of Chicago.

Martha Ann Mann

Otilia D. Goode

George B. Denton

RESEARCH CONSULTANT

George B. Denton joined the staff of the Association in 1949 as research consultant, Bureau of Library and Indexing Service.

Born in Detroit, Dr. Denton received his A.B., M.A., and Ph.D. degrees at the University of Michigan. He taught history and rhetoric at the University of Michigan from 1907 to 1909, and was an assistant instructor in English at the University of Illinois in 1909 and 1910. In 1912 he became an English instructor at Northwestern University; in 1917 he switched to the staff of the Dental School at Northwestern. He served as an instructor in technical composition; in 1918 he became an assistant professor and in 1919 a professor. Under Dr. Denton's supervision, seminar courses in dentistry were introduced in 1919 at Northwestern University Dental School. From 1934 to 1949 Dr. Denton taught dental history and literature.

Since joining the Association staff, Dr. Denton has developed a dental nomenclature project, including three workshop conferences on dental terminology. Out of this work grew the volume, *The Vocabulary of Dentistry and Oral Science*, written by Dr. Denton and published by the Association in 1958. Dr. Denton is the author of many articles on dental history. Since 1953 he has served as editor of the *Bulletin of the History of Dentistry*, monthly publication of the American Academy of the History of Dentistry. He is at work on a history of dentistry.

editorials

Dental Abstracts growing up

Readers of DENTAL ABSTRACTS will see some changes in the July issue. One will be noticed at once—a distinctly new and strikingly different cover. Others will be found throughout the book—changes in layout, changes in type faces, changes in organization of content—all designed to improve communication between writer and reader, and to provide more information on more aspects of dentistry to more members of the profession. All changes were made after consultation with subscribers, dental educators, dental researchers and staff members of the American Dental Association.

Future front covers of DENTAL ABSTRACTS will carry illustrations relating to one of the abstracts. Color will be used, both on the cover and inside the book. The classification of abstracts has been simplified. All abstracts will be found under five major headings: dental practice, dental research, dental education, dental health and general. Each section will have its own title page and subindex.

Titles of some articles will be rewritten to make them more informative, although the original title will be retained in the reference material appearing at the end of the abstract. As formerly, the reference data will include the name of the author(s), his address, title of the article, name of the periodical in which the original article appeared, volume number, pages, month and year of issue.

A group of editorial consultants is being formed consisting of outstanding representatives of dentistry in this country and abroad. They will aid in the selection of material for abstracting, and will advise the editorial staff on the content and quality of the abstracts.

A column of "News and Notes" will carry news and comments, including observations by consultants on abstracts appearing in each issue. An increasing percentage of the abstracts will present material of special help and interest to the general dental practitioner.

During its first five years of life, DENTAL ABSTRACTS has demonstrated that it has an important work to do, that of enlarging communication throughout the profession. This work it will continue to perform in the future, with no departure from the

original purpose of the book: to keep the busy dentist better informed on what is being said and done in dentistry throughout the world.

All articles from which abstracts are made are on file in the Library of the American Dental Association and may be borrowed without charge by subscribers. The subscription price of DENTAL ABSTRACTS remains unchanged—$8.00 a year in the United States, $9.00 elsewhere.

On the selection of a location in which to practice

This being the season of the year when hundreds of young dentists, their national and state board examinations behind them, are seeking a suitable location in which to establish a practice, the following advice would seem to be timely.

. . . The tendency to flock to large cities is a great and growing evil, affecting people of all classes and vocations. Mr. Greeley has many times written upon this subject, and it is to be hoped that his friendly advice has been accepted by some who otherwise would have gravitated to the cesspools of vice and crime. But it is not to people in general that I propose to speak—only to dentists, and especially to those of towns and villages.

It is true that the dental schools are located in the large cities, and necessarily so, as only there can a sufficient number of suitably qualified teachers be organized into a faculty; and it is also true that the advantages of weekly or fortnightly meetings of dental associations are to be found in dense populations. . . .

It must not be supposed, however, that all the dentists of cities are the better qualified for the educational advantages within their reach; for, of the two hundred resident in the cities of New York and Brooklyn, not one-fourth part attend any of the meetings of the five dental societies whose doors are open at their sessions. As for the dental journals—those indispensable helps to those who would progress in dentistry—they are quite as accessible and as liable to be read by the rural dentist as by his city brother, for the people of cities have many things to divide their attention, and have really less time to spare and less inclination to study than have their country friends. When a man dependent on his own labor has to pay from one to three thousand dollars for the rent of his domicile, and to meet other expenses amounting to twice as much more, it is hardly supposable that he will be quite free from care, or that he will have much time to devote to study and scientific investigation. If we add to this, that the confinement to the dental office and to incessant and unhealthy toil make nine-tenths of our city practitioners dyspeptics, by which they are unfitted for study, we have a counterbalancing advantage in favor of the country dentist, who has his dog and gun, a garden, a grapery, and a saddle-horse to take him much out of doors, thus keeping him in health, and so better fitted for vigorous mental labor and study during the hours unoccupied by professional duties.

It is true that in cities some dentists get large fees; and many an aircastle has been founded on the fact that Dunning gets from fifteen to twenty dollars for small fillings, and that Atkinson thinks nothing of charging a hundred dollars for an operation. All the shadowy structure vanishes before the facts, however. One may count upon his fingers all who have obtained competencies by dentistry alone in the cities of New York and Brooklyn, while the great mass of the remainder struggle against increasing expenses—paying their earnings to landlords, and finally die houseless, with little more than enough to bury them decently. . . .

In a town, where property is cheaper, almost any dentist may own his home, but in a great city like New York, a house in a locality suitable for one aspiring to a first-class practice is worth from twenty-five to fifty thousand dollars, and it is questionable whether he who has the means to purchase such a house would not be wise to retire to the country and live on his money. . . .

Many are attracted to the cities by the supposition that only there can they obtain remunerative prices for first-class operations; and this certainly seems a plausible reason for migrating;

but let us examine it a little. In the first place, several years will elapse before the moneyed people will find their way to your office. Secondly, in the country, you get in food, raiment, and shelter all the necessities and many of the luxuries of life—an equivalent for your services quite equal to what you would be likely to get in a city. For instance, in a small place a good residence can be had for three or four hundred dollars a year, while the rent of a correspondingly good one in the city of New York would be eight or ten times as much; so it happens that the twenty dollars and the one hundred dollar fees are absorbed by the every-day expenses incident to a city life, and the income tax list shows that the recipients of large fees are not necessarily saving more money than they would be likely to save in a country town, with smaller fees and more moderate expenses. . . .

If any object that the foregoing is singular advocacy from a city dentist who migrated from the country, I reply that my evidence is worth all the more on that account, and that the wisdom of my suggestions is confirmed by my own experience.

These observations, written by a New York dentist, J. S. Latimer, and published in the January, 1870 issue of *Dental Cosmos* prove once again that while times change, the nature of man, including the nature of dentists, does not. Dr. Latimer's comments on the relative merits of a metropolitan and a country town practice, on attendance at dental meetings, on the accessibility of dental literature, on fees and on relative net income are as true today as when he wrote them almost a hundred years ago. For instance, the Bureau of Economic Research and Statistics of the Association reports that in 1959 the average income of dentists in two American cities of over a million population was less than the average for dentists in towns of 5,000 to 10,000 population. Office overhead, as a percentage of gross income, was lower in towns with less than 1,000 population than in any other city-size category. If Dr. Latimer or Mr. Horace Greeley were alive today, they would have no occasion to quarrel with the Bureau's findings.

The amalgam restoration—laboratory and clinical aspects

More correlation between the basic science staffs and the clinical staffs of dental schools is needed in the investigation of restorative materials used in dental service. Otherwise, much of the clinical testing is without discipline and gives little or no quantitative evaluation. Unfortunately, in many instances, the clinical staff is not trained to conduct a disciplined examination of a material or of a technic from a laboratory standpoint, and usually the basic science staff is not trained in the conduct of clinical experimentation. Too often members of each staff stand in their own corners and fail to communicate adequately with each other with the result that far too often the science of dental materials suffers. It suffers for the want of researchers who have a thorough understanding of both the basic sciences and the clinical sciences—an understanding which could make restorative materials more effective in the improvement of dental health service.

The amalgam restoration, which accounts for more than three out of four restorations of individual teeth, is a good example. The type of investigative work needed is vividly shown in the article, "The Relation of Mercury to the Amalgam Restoration," on page 8 of this issue.

news of dentistry

Outline program of the suggested joint commission for accrediting laboratories

(On May 6-7, work parties representing the American Dental Association and the National Association of Dental Laboratories agreed to recommend to their respective organizations the establishment of a national joint commission for accreditation of dental laboratories. A full report will be available in the August issues of the *NADL Journal* and THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.)

The purpose of the commission would be to assist the dental profession in its efforts to improve the quality and efficiency of care of the public.

The decision to have one national organization rather than a number of state or local ones was based on several reasons: Laboratory suppliers and many laboratories engage in interstate commerce; a dentist from one state often deals with a laboratory from a different state, and local programs affect interstate commerce and would be subject to federal laws. Finally, if the program is national, A.D.A.-N.A.D.L. attorneys are confident the Justice Department will issue a clearance letter stating it would not institute criminal proceedings against the commission or its members for antitrust violations.

The board will consist of three members appointed by the N.A.D.L., three by the Association and one each by three other professional organizations. Each member will have one vote.

Action will depend on a majority vote (five members), which will be binding. A salaried director, not necessarily a dentist, and a small staff will handle operations.

The commission will be controlled professionally, though no one group can control it. Such an arrangement is not only consistent with the purpose of the commission but is also responsive to Justice Department comments that the problem of restraint of trade and unfair competition could arise if the program were industry-controlled.

The standards for accreditation are still being refined by a N.A.D.L.-A.D.A. committee. However, the final version will encompass such considerations as: (1) certification status of technicians, and equipment and materials available to them; (2) physical environment of laboratory and its observance of government regulations on employment practices, safety and health standards; (3) dental appliances produced only with a dentist's directive, including written work orders in those states requiring them, and (4) rigid adherence to regulations forbidding any direct dealings with the public.

Although the commission board will

designate inspectors, the primary source of inspectors probably will be prosthetic faculties of dental schools and state boards of dental examiners. Standards, not opinion, will govern inspection procedures. If the inspector denies accreditation, there will be a process for appeal to the board of commissioners or a subcommittee. Reinspection will be periodic but not annual.

Initial membership and inspection fee will be $40 to $50 plus $2.50 to $3.00 per technician employed. A maximum ceiling will be established and renewal fees will be considerably less. Within a few years, the commission should be self-supporting. The American Dental Association will underwrite early operating deficits.

A certificate will be awarded to accredited laboratories which will have considerable advertising value, though restricted to the profession.

Membership in the commission will be voluntary. However, the organization's effectiveness will be related to the number of laboratories that join.

Association Affairs

SEBELIUS NAMED SECRETARY, COUNCIL ON DENTAL HEALTH

Carl L. Sebelius, director, Tennessee Division of Dental Health, has been named an assistant secretary of the American Dental Association and secretary of the Councils on Dental Health and International Relations. He will assume his duties at the Central Office on August 1.

A graduate of Northwestern University School of Dentistry and the University of Michigan School of Public Health, Dr. Sebelius served his internship at the U.S. Public Health Service Marine Hospital in New York City, 1934-1936.

Dr. Sebelius served as assistant director of the Tennessee Division of Dental Health, 1936-1942, and as its director, 1942-1956 and 1958 until the present. From 1956 to 1958 he was a WHO dental health officer in Geneva, Switzerland.

In 1958, Dr. Sebelius was a member of the WHO expert advisory panel on dental health. He has served as chairman of the American Dental Association's section on dental public health (1950), subcommittee on civil defense (1954-1956), and Council on International Relations (1960). He has been president of the American Association of Public Health Dentists (1953) and of the State and Territorial Dental Health Officers (1953-1954).

Carl L. Sebelius

Dr. Sebelius is a diplomate of the American Board of Dental Public Health, and a Fellow of the American College of Dentists and of the American Public Health Association.

He will be succeeded in the Tennessee Department of Public Health by Albert H. Trithart. Dr. Trithart is a graduate of Muskingum College, University of Pittsburgh School of Dentistry and the University of Michigan School of Public Health. He served as a regional dental officer with the Tennessee Department of Public Health from 1945 to 1958 with a two-year leave (1952-1954) as a dental officer in the U.S. Army. From 1958 until the present, he has been director of the Montana Division of Dental Health.

ASSOCIATION SPOKESMEN MEET WITH PRESIDENT KENNEDY

Representatives of the American Dental Association met with President John F. Kennedy May 26 at the White House to

Charles H. Patton, Association president, presents President John F. Kennedy with a copy of the report of the Survey of Dentistry during a meeting in the Cabinet Room of the White House, May 26. Watching the presentation are: (from the left) Rep. John E. Fogarty (D.-R.I.), Harold Hillenbrand, Association secretary; Bernard J. Conway, assistant secretary; C. Willard Camalier, assistant secretary, and John R. Abel, president-elect. The meeting was held to brief President Kennedy on current dental affairs. (Picture courtesy of WPRO-TV Photo Department, Providence, R.I.)

brief him on current dental affairs. The half-hour meeting had been arranged several months in advance but, because of the pressure of international affairs, there was some doubt until the last minute that it would be held. Association members of the delegation included President Charles H. Patton, President-elect John R. Abel, Secretary Harold Hillenbrand and assistant secretaries, C. Willard Camalier and Bernard J. Conway. Two congressional supporters of dentistry were also present: Sen. Lister Hill (D.-Ala.) and Rep. John E. Fogarty (D.-R.I.).

During the meeting, Dr. Patton presented to Mr. Kennedy:

—A renewal of the invitation to address the 102nd annual session in Philadelphia.

—A reaffirmation of Association support of specific parts of Mr. Kennedy's health program, particularly provision of federal funds for construction and renovation of dental and medical schools and scholarships for their students.

—A specially bound copy of the *Survey of Dentistry* which emphasizes manpower and educational problems in the profession.

In accordance with custom, no statement was issued by the chief executive and no formal comment was made on the Association's proposals.

BURKET, PENNSYLVANIA DEAN, NAMED TO EDUCATION COUNCIL

Lester W. Burket, dean, University of Pennsylvania School of Dentistry, has been appointed to the American Dental Association's Council on Dental Education, succeeding John E. Buhler who resigned.

Dr. Burket was nominated by the American Association of Dental Schools to fill the vacancy until the annual session in October, when the House of Delegates will elect a person for the balance of the term ending in 1962.

OWEN RALL, LEGAL COUNSEL, NAMED BAR ASSOCIATION HEAD

Owen Rall, legal counsel and honorary member of the American Dental Association, was elected president of the Illinois State Bar Association at the group's annual meeting in St. Louis, June 14-17. Mr. Rall is a member of the Chicago law firm of Peterson, Lowry, Rall, Barber and Ross, with which he has been associated since 1933.

He has served on various committees

of the Chicago Bar Association and the Illinois State Bar Association and has been a vice-president of the latter. He has been a member of the Judicial Advisory Council of Illinois by appointment of the governor, president of the Legal Club of Chicago, and a member of the board of governors of the Bar Association of the Seventh Federal Circuit. Mr. Rall is a graduate of Coe College and Northwestern University School of Law.

MILLER NAMED ACTING HEAD OF DENTAL EDUCATION

Ben F. Miller III has been appointed acting secretary of the Council on Dental Education. He assumed the post June 1 when Shailer Peterson resigned to become dean of the University of Tennessee School of Dentistry. Mr. Miller has been an assistant secretary of the Council since joining the Association staff in 1957.

In other personnel changes at the Central Office, Gory N. Casto, Jr., and Mel Garbar have resigned. Dr. Casto, assistant secretary, and secretary of the Council on Scientific Session and of International Relations, left June 30. Mr. Garbar, assistant director of the Bureau of Public Information, resigned June 1.

DENTAL EXHIBITS HONORED AT NATIONAL SCIENCE FAIR

The American Dental Association honored four teen-agers for having the outstanding exhibits related to dental science at the National Science Fair, held May 10-13 in Kansas City. Certificates of superior achievement were presented to Ann Elizabeth Stuart, 17, of Camp Hill, Pa., and Barbara E. Parker, 17, of Detroit. Certificates of meritorious achievement and $50 gift certificates for scientific equipment were presented to Joan Karen Palmer, 18, of Birmingham, Ala., and David C. Hill, 18, of Grand Blanc, Mich.

Miss Stuart's exhibit dealt with "Development of lysozyme-resistant mutant

The American Dental Association presented four teen-agers with special awards for having the outstanding exhibits relating to dental science at the National Science Fair, held May 10-13 in Kansas City. Association judges and the winners are: (From the left) Jarvis M. Williams, chairman, Council on Scientific Session; Barbara E. Parker, Detroit; Ann Elizabeth Stuart, Camp Hill, Pa.; John R. Abel, Association president-elect; Joan Karen Palmer, Birmingham, Ala.; David C. Hill, Grand Blanc, Mich.; James H. O'Banion, past president, Washington State Dental Association, and John S. Eilar, trustee of the Twelfth District. Not pictured are Hamilton B. G. Robinson, dean, University of Kansas City School of Dentistry, who also served as a judge, and Cecil C. Connelly, president, Missouri State Dental Association, who was present during the meeting.

Representatives of the American Dental Association and the National Association of Dental Laboratories met in the Central Office in Chicago, May 6-7, to discuss the establishment of a national joint commission for accreditation of dental laboratories. Shown during the meeting are: (Seated, l. to r.) Mr. Ben F. Miller III,* Mr. Bernard J. Beazley, George H. Fitz,* Walter E. Dundon,* Worthington G. Schenk,* Harry M. Klenda,* J. Eugene Ziegler,* Mr. Homer Dickson, Mr. George Klein, Miss Doris Johnson (recorder), Mr. Thomas McAndrews, Mr. Nathan Cooper, Mr. Maurice Y. Nicole, Mr. Horace J. Denner, Mr. Kelley E. Griffith and Mr. John F. Auderer, Jr. (Standing, l. to r.) Mr. John P. Noone,* Harold Hillenbrand,* Leslie M. Fitzgerald,* Mr. Hoyt E. Cushman, Mr. Markus Ring, Mr. Ralph D. Sanders, Mr. Don Nuenschwander, and Mr. Paul A. Slone.
*Representatives of the American Dental Association

—bacillus megaterium" and Miss Parker's was on "Effects of high-frequency waves on animal tissues." These two winners will be the Association's guests at its 1961 annual session in Philadelphia.

Miss Palmer's exhibit considered "Nutritional values of various carbohydrates in white rats" and Mr. Hill's was on "New titanium polymers."

Judges for the Association were: Hamilton B. G. Robinson, John S. Eilar, James H. O'Banion and Jarvis M. Williams.

STATEMENT ON DENTAL CARE IN NURSING HOMES ISSUED

The American Dental Association issued a statement on dental care in nursing homes May 22 to members of the Tripartite Committee, consisting of the American Medical Association, American Hospital Association and American Nursing Home Association. The nursing home association will send 5,000 copies of the statement to its members to aid them in planning effective dental care programs.

The following suggestions and statements for maintaining a high standard of dental care were submitted by the American Dental Association:

1. All nursing home residents should receive a dental examination at the time of their initial entrance into the home.

2. Local dental societies should develop programs to provide for relief of pain and elimination of infection for nursing home residents.

3. Ambulatory residents should be transported to the dental office of their choice for necessary treatment.

4. Portable dental equipment should be available in order that dentists may render necessary treatment in the nursing home for nonambulatory patients.

5. It must be remembered that many of the residents of nursing homes who have dental problems are either unwilling or unable to accept dental treatment.

6. It must also be remembered that, if the national picture of the edentulous patient without dentures is similar to that found among nursing home residents in Illinois (29 per cent) it will be impossible to provide a total and immediate remedy without seriously taxing the dental manpower and the financing agency.

Paul K. Musselman (r.), trustee of the Fourth District, presents an award for outstanding service to dental education from the American Dental Association to Bert Claster, Baltimore television producer of Romper Room. Mrs. Claster, who originated the show and does the role of Miss Nancy, holds the award. Romper Room has assisted with Children's Dental Health Week for the past four years.

7. Some method of providing payment for care should be developed for those nursing home residents who desire care but who are not financially able to purchase it. The method should be determined at the community level.

The following program of oral hygiene for the day-to-day care of the residents of nursing homes was recommended. This regimen of daily care may be the starting point of the entire dental care program:

1. *The Nurse's Role:* One of the most important considerations that a nurse should have for the patient is that of good oral hygiene. In nursing homes, many patients do not have the strength or emotional stability to maintain good oral hygiene. The nurse should aid and instruct the patient in brushing his teeth at proper times. Where this procedure is not possible, the patient's lips, teeth and gingivae should be rubbed lightly with moistened cotton or gauze. All removable prostheses should be cleansed properly. The nurse should be trained to identify oral lesions, swellings and other irregularities, and to call the dentist when such lesions are noted.

2. *Instructions to the Patient:* In order to encourage full cooperation, the patient should be instructed in the following areas of personal hygiene:

a. The role of toothpastes, powders and mouthwashes in proper oral hygiene

b. The methods of toothbrushing and the type of brush to use

c. The proper use of dental floss

d. The care and cleansing of prosthetic appliances

e. The importance of daily oral hygiene maintenance for the patient's well-being.

3. *The Dentist's Role:* Periodic examination, relief of pain and the rendering of necessary professional services are the responsibility of the dentist. The dentist in conjunction with the physician, should indicate the diet for the patient to insure proper nutrition.

C. FRENCH, ASSISTANT HEAD, HEALTH EDUCATION BUREAU

Charles A. French has been appointed assistant director, Bureau of Dental Health Education. He assumed the duties of this newly created position June 15.

Charles A. French

Mr. French was formerly on the faculties of Evanston (Ill.) Township High School (1952-1956) and of Maine Township High School, Des Plaines, Ill., (1960-1961). He served as a curriculum consultant with the National Safety Council from 1956 to 1960.

A graduate of the University of Chicago (M.A.), Mr. French also attended the University of Grenoble in France and Cambridge University in England while he was with the U.S. Army.

ASSOCIATION SENDS SCROLL TO SWISS DENTAL SOCIETY

The American Dental Association presented a scroll to the Swiss Dental Society (Société Suisse d'Odonto-Stomatologie) in commemoration of its seventy-fifth anniversary. The Swiss group celebrated this occasion during its annual congress held in Basel, June 1-4, 1961.

COUNCIL REVIEWS, RENEWS CREST'S "B" CLASSIFICATION

The Council on Dental Therapeutics of the American Dental Association renewed the "B" classification of Crest dentifrice at its meeting June 15-17 at the Central Office.

The Council reviewed all available scientific studies on the stannous fluoride dentifrice, including results of a three-year study, before voting to renew the classification. At the time of the original classification, only two-year studies were available.

The Council also reiterated its statement originally published in the August, 1960 issue of THE JOURNAL, as follows:

"Crest has been shown to be an effective decay preventive dentifrice that can be of significant value when used in a conscientiously applied program of oral hygiene and regular professional care."

Dental Societies

CLINICIANS, ESSAYISTS NEEDED FOR 'SPACE AGE' SESSION

The Washington State Dental Association has invited dentists to submit applications as table clinicians and essayists for its 1962 "Century 21" Scientific Session.

The Century 21 Exposition and Space Age World's Fair will be held in Seattle, Wash., from April 21 to October 21, 1962. It will be the first international exposition in the United States since 1939 and will feature the most extensive scientific exhibit ever assembled.

The Washington dental association will hold its 1962 scientific session June 25-28 and will feature the exposition. Application forms for clinicians and essayists may be obtained from the program chairman, 1962 Scientific Session, Washington State Dental Association, 417 Grosvenor House, Seattle 1, Wash.

Honorary S.A.P.D. (space age pioneer dentist) degrees are being given to dental leaders by the Washington State Dental Association. They are part of the group's promotion for its 1962 scientific session which will be held in conjunction with the Century 21 Exposition and World's Fair in Seattle. Dr. Wes Day (r.) shares his "degree" with President-elect Donald R. Shaw (l.) and President George D. Dore, Jr., of the Washington association. Similar degrees have been presented to Rulon W. Oppenshaw, chairman, A.D.A. Council on Dental Health, and Harold Hillenbrand, secretary, American Dental Association. The name of the cartoon figure, Wes Day, is taken from the initials W.S.D.A.

COURSE FOR EXILED CUBAN DENTISTS ENDS IN MIAMI

The three month postgraduate program for exiled Cuban dentists, sponsored by the Miami Dental Society in cooperation with the University of Miami, has been completed.

Lectures were given simultaneously in English and in Spanish by exiled professors of the University of Havana School of Dentistry and by dentists practicing in Miami. In addition, all participating dentists observed dental practice at the Lindsey Hopkins Dental Research Clinic.

Barry College also gave intensive courses in English for the exiled dentists.

PHILLIPS NAMED SECRETARY, NEW YORK DENTAL SOCIETY

Percy T. Phillips, past president of the American Dental Association, was named executive secretary of the New York State Dental Society at the group's annual meeting, May 15-17, in Syracuse. Dr. Phillips was the first speaker of the American Dental Association's House of Delegates, serving in 1948, 1949 and 1950. He was elected a member of the Association's Board of Trustees in 1951 to represent the Second District, and was completing his second term as a trustee when named president-elect in 1957. Dr. Phillips is also a former president of the First District Dental Society of the State of New York and of the Bronx County Dental Society.

MID-CONTINENT DENTAL MEETING IN ST. LOUIS

The twentieth annual Mid-Continent Dental Congress, sponsored by the St. Louis Dental Society, will be held October 29-November 1 at the Chase Hotel in St. Louis. A four-hour course, "Stress, time and motion studies as applied to everyday dental practice," will be given by John A. Anderson.

Other essayists will include: George C. Paffenbarger, William E. Koch, Jr., Richard F. Rabe, Roland W. Dykema, Lloyd J. Phillips, Robert E. Allen, Bernard Jankelson, Norman H. Olsen and Stanleigh B. McDonald.

Complete details may be obtained from: The Greater St. Louis Dental Society, 8013 Maryland Ave., Clayton 5, Mo.

PUERTO RICO CONVENTION PLANNED FOR OCTOBER

The Puerto Rico Dental Association will hold its annual scientific convention immediately after the American Dental Association meeting in Philadelphia. Sponsored jointly with the Colegio de Cirujanos Dentistas de Puerto Rico, the meeting is set for October 20-25.

Examining a new ear piece which was used in helping to transmit Spanish-English translations during a postgraduate course just finished in Miami, Fla., for refugee Cuban dentists, are: (from left) Charles Holt, co-initiator of the course; H. Willett Stubbs, president-elect, Miami Dental Society; Raul Mena, exiled dean, University of Havana School of Dentistry, and Norman Alley, co-initiator of the course.

Members of the committee on legislation of the Michigan State Dental Association are shown during a breakfast meeting with congressional legislators from that state in Washington, D.C. Participants in the meeting are: (reading clockwise, starting at upper left) Mr. Robert Ansheles, executive director, American Thrift Assembly; James D. Happle; Richard Brooks; Mr. Hal M. Christensen, American Dental Association Washington counsel; George C. Taft; Rep. Charles E. Chamberlain; John G. Nolen; Mr. Richard Augenstein, executive assistant, Michigan State Dental Association; Mr. Herbert Mehler (from Rep. August E. Johansen's office); William W. Creason; Rep. Gerald R. Ford, Jr.; J. A. Lubbers; Sen. Philip A. Hart; C. Willard Camalier, assistant secretary, American Dental Association; Rep. Elford A. Cederberg, and Edward A. Cheney.

A postconvention package tour has been arranged for after the Philadelphia meeting. It will take only three and one half hours by jet to Puerto Rico. The tour includes round-trip transportation, first-class beach hotels, registration, sightseeing tours of the island, and social activities.

Further information may be obtained from Luis Toro, chairman, convention committee, P.O. Box 9023, Santurce, Puerto Rico, U.S.A.

MISSOURI STATE DENTAL ASSOCIATION CHANGES NAME

The name of the Missouri State Dental Association was changed June 7 to Missouri Dental Association. A change in the mailing address of the association also has been made. The new address is: 101 W. High St., Suite 201, Jefferson City, Mo.

MICHIGAN DENTAL COMMITTEE MEETS WITH LEGISLATORS

The Michigan State Dental Association's committee on legislation met with that state's Congressional delegation in Washington, D.C., May 17-18, to discuss legislation. Arrangements for the trip were made by Mr. Hal Christensen, American Dental Association's Washington Counsel, and Mr. H. Leon Snow, executive secretary of the Michigan society.

The committee met with both Michigan senators, Pat McNamara (D.-Detroit) and Philip A. Hart (D.-Mackinac Island), and 9 of the state's 18 representatives. The delegation urged support of measures endorsed by the American Dental Association, such as the Keogh bill, categorical grants-in-aid for state dental public health activities, aid to dental education and dental research appropriations.

Members of the Michigan committee included: Mr. Richard E. Augenstein, executive assistant; Richard G. Brooks, William W. Creason, James D. Happle, Julius A. Lubbers, John G. Nolen, George C. Taft, Jr., and Edward A. Cheney.

The Washington office would be glad to assist other state groups who would like to make a similar trip.

Legislation

BRITISH COLUMBIA COURT VOIDS TECHNICIANS ACT

A trial court of British Columbia has invalidated regulations issued in 1960 under that province's Dental Technicians Act which governs the issuance of special licenses to dental technicians. The now

West Virginia governor, W. W. Barron, signs into law the bill to revise the West Virginia Dental Practices Act, after its successful passage in the 1961 legislature. Witnessing the signature are Paul F. Giffen (l.), member of the House of Delegates, and J. Bernard Poindexter, House member and past president, West Virginia State Dental Society. Dr. Poindexter served as the society's legislative committee chairman during the drafting of the bill and steered it through both houses. The bill is designed to strengthen the law's provisions governing enforcement against the unauthorized practice of dentistry.

void regulations granted licenses to deal directly with the public to dental technicians who had a minimum of 12 years of experience, of which seven had been spent in dealing directly with the public.

In effect, since this was the first time such licenses had been issued, a dental technician, in order to qualify, would have had to have been breaking the law in the past. The court, however, commented neither on this aspect of the regulations nor on the oral health issues involved. Instead, it based its action on the finding that the regulations were unduly restrictive, and discriminated against the general field of dental technicians.

HOUSE VOTES RECORD FUNDS FOR DENTISTRY—$16,863,000

The House of Representatives voted $16,863,000 for dental research, services and resources for the fiscal year 1962. The funds were approved May 17 as part of a four billion dollar budget for the Department of Health, Education, and Welfare. Of the total allocation, $14,681,000 will go to the National Institute of Dental Research and the remainder for dental services and resources. Action by the Senate and President Kennedy is required before the funds are assured.

National Defense

MAJ. GEN. BERNIER NAMED TO BRITISH MEDICAL SOCIETY

Maj. Gen. Joseph L. Bernier, chief of the Army Dental Corps, has been selected as a Fellow of the British Royal Society of Medicine. General Bernier was the only American selected and the only dental surgeon included in a group of physicians from various parts of the British Empire, as well as from Egypt, Teheran, and Eire.

U.S. DENTAL OFFICERS IN KOREA HOLD FIRST SEMINAR

The Thirty-Eighth Parallel Dental Society, an organization of U.S. military dentists stationed in Korea, presented its first annual dental seminar May 5-6 in Seoul, Korea.

Essayists included George Paffenbarger, senior research director, American Dental Association; Maj. James C. Hayes, U.S. Army Medical Corps; Col. Benjamin W. Dunn, U.S. Air Force; Kim Nhak Hee, Severance Hospital, Seoul; Sveinn Bjornsson, Scandinavian National Medical Center, Korea; and Lt. Col. Sherwood W. Benhart, U.S. Air Force.

The program also included two panel discussions, 16 table clinics, and commercial exhibits by Korean and Japanese supply houses.

Public Health

J. G. WILLIAMS, DENTIST, HEADS GEORGIA HEALTH BOARD

James Griffin Williams, the first dentist to become chairman of the Georgia Board of Health and one of only three dentist-

chairmen of state health boards in the United States, started, almost single-handedly, Georgia's dental health program in 1921. He has developed it into a system which has become a model for other states.

Although last December, at the age of 75, Dr. Williams retired as professor of dentistry and lecturer in public health dentistry at Emory University School of Dentistry, he still maintains a full-time private practice, heads the state board and campaigns for fluoridation of water supplies.

Dr. Williams graduated from Southern Dental College (now Emory's School of Dentistry) in 1910 and entered private practice. He became a public dental health pioneer in 1913 when he set up a dental program for pupils at Grant Park School in Atlanta. In 1921, Dr. Williams got the first appropriation of $1,000 for the city's school dental program. Free examinations and dental work were extended to other city schools until every school child in Atlanta got the dental care he needed.

Appointed to the state board of health in 1931, Dr. Williams worked through local health departments, easing and forcing dental care into the public health program. Under Dr. Williams, Georgia's dental health program was one of the first.

After much persuasion, he finally obtained in 1953 a paid director of dental health for Georgia and he resigned as the part-time unpaid dental division director. The most recent accomplishment in his dental health career was being named chairman of the Georgia Health Board in June 1960.

Dr. Williams was honored in 1953 and 1959 by the American Association of Public Health Dentists. He is a master of the International College of Dentists. He is a past president of the Georgia Public Health Association and the American Association of Public Health Dentists. He became the first honorary member of the Southeastern Dental Society at a testimonial dinner given for him in 1954. At present, he is a consultant to the Veterans Administration.

James Griffin Williams, a practicing dentist for over 50 years, is the first dentist to become chairman of the Georgia Board of Health and one of only three dentist-chairmen of state health boards in the United States. He is shown in his office in Atlanta's Medical Arts Building.

Dental Education

MORRIS APPOINTED DEAN OF NEW KENTUCKY DENTAL SCHOOL

Alvin J. Morris, assistant professor in oral medicine, University of Pennsylvania School of Dentistry, has been appointed dean of the University of Kentucky's new College of Dentistry. Dr. Morris assumed his duties July 1; the new school will accept its first class in September 1962.

A graduate of the University of Michigan School of Dentistry and the University of Rochester School of Medicine and Dentistry (Ph.D.), Dr. Morris has served as an instructor in anatomy and physiology at the Eastman School of Dental Hygiene and has been a postdoctorate research fellow of the National Institute

of Dental Research. He is a member of the American Dental Association's Council on Dental Therapeutics.

SCHOLARSHIP PROGRAM SET UP FOR DENTAL TECHNICIANS

The Dentists' Supply Company has established a national scholarship program for dental laboratory technicians, according to Mr. Henry M. Thornton, president of the company. Two tuition scholarships have been established for the school year, 1961-1962, and the company plans to create two additional scholarships for the next school year, thereafter, to maintain the four on an annual basis.

The scholarships will be administered by the Fund for Dental Education in consultation with the National Association of Dental Laboratories and are available only to students enrolling in schools approved by the Council on Dental Education of the American Dental Association.

Application blanks may be obtained from the Fund for Dental Education, 840 N. Lake Shore Drive, Chicago; the Dentists' Supply Company, 500 W. College Ave., York, Pa.; or the National Association of Dental Laboratories, 201 Mills Bldg., 17 and Pennsylvania Avenues, Washington 6, D.C.

PEDODONTIC SEMINAR SET FOR CALIFORNIA RANCH

The sixth annual Pedodontic Seminar of the California State Unit of the American Society of Dentistry for Children will be held September 14-17 at the Alisal Ranch, Solvang, Calif. Herbert K. Cooper, director, Lancaster (Pa.) Cleft Palate Clinic, will participate in the program on dental-oral-facial deformities. Cost of the seminar is $85 per member and an additional $65 for wife. This includes meals and lodging. Applications may be made to John Allan Bier, chairman, 760 Market St., Suite 1016, San Francisco 2.

MARQUETTE DENTAL SCHOOL HONORS PROFESSOR ABBOTT

Thomas R. Abbott, professor of operative dentistry at the Marquette University School of Dentistry, received a $500 award for teaching excellence at the university's annual Pere Marquette dinner for its faculty May 15. A member of the dental school faculty since 1934, Dr. Abbott was cited for teaching "characterized by careful preparation and clear presentation and supported by the best of contemporary dental knowledge available in the clinical and preclinical fields." He is a Marquette graduate and former resident dentist at Milwaukee Children's Hospital.

CASUALTY TREATMENT COURSES AVAILABLE AT SAN DIEGO

Space for two civilian dentists has been reserved for each of two casualty treatment training courses to be held at the U.S. Naval Training Center, San Diego, Oct. 9-13 and Nov. 6-10, 1961. Interested persons should contact Herbert C. Lassiter, secretary, Council on Federal Dental Services, A.D.A. Central Office.

DENTAL LABORATORIES RAISE FUNDS FOR DENTAL EDUCATION

The National Association of Dental Laboratories is launching a nationwide campaign to raise funds in support of dental education. Robert J. Rothstein, chairman of the board of Rothstein Dental Laboratories, Inc., Washington, D.C., has been appointed national chairman of the campaign, which is being conducted in cooperation with the Fund for Dental Education.

ADVANCED STUDY COURSES GIVEN FROM COAST TO COAST

Baylor • Baylor University College of Dentistry has instituted a 24 month graduate course in orthodontics, particularly the edgewise technic. A maximum of six applicants

will be selected annually. Further information may be obtained from the registrar, Baylor University College of Dentistry, 800 Hall St., Dallas 10, Texas.

Boston • The Department of Stomatology, Boston University School of Medicine and Massachusetts Memorial Hospitals have announced a special course, esthetics in restorative dentistry, to be given October 20-21 by Charles Pincus. Further information may be obtained from David J. Baraban, Director of Postgraduate Studies, Massachusetts Memorial Hospitals, 750 Harrison Ave., Boston 18.

California • The University of California, San Francisco Medical Center, is offering two postgraduate courses: current concepts in the administration of a successful dental practice, September 15-16, Cecil H. Bliss, and restorative dentistry, September 29-30, John C. Bartels. Further information may be obtained from Marilyn J. Johnson, Postgraduate Education, University of California, San Francisco Medical Center, San Francisco 22.

Columbia • Columbia University School of Dental and Oral Surgery is offering two residency programs in cooperation with Grasslands Hospital. The two year programs are in oral surgery and prosthodontics. The hospital will furnish a stipend of $3,000 for the first year and $3,600 for the second year. Room, board and laundry are also provided. The resident trainee will be responsible for his tuition at the university, which is approximately $1,500 for the two years. Applications may be obtained from the director, Grasslands Hospital, Valhalla, N.Y.

Lancaster Cleft Palate Clinic • Graduate trainingship grant awards are available for a course at the clinic, October 9-16, on the rehabilitation program of the oral-facial-speech handicapped. Further information may be obtained from Robert T. Millard, Program Director, Lancaster Cleft Palate Clinic, 24 N. Lime St., Lancaster, Pa.

Ohio • The postgraduate division of the Ohio State University College of Dentistry will offer three courses this fall: complete denture prosthodontics, October 2-6, Carl O. Boucher, fee $75; general anesthesia, November 13-17, Morgan L. Allison, fee $75, and oral surgery, November 27-29, Morgan L. Allison, fee $75. Further information may be obtained from the College of Dentistry, Postgraduate Division, Ohio State University, Columbus 10.

Southern California • The University of Southern California School of Dentistry has announced four courses for this summer: pulp reactions to operative procedures, July 15-16, Samuel Seltzer, I. B. Bender, $70; postgraduate seminar, July 17-21, Rex Ingraham, Henry M. Tanner, A. Earl Pound, Leroy E. Knowles, Nathan Friedman, $180; apical tissue reactions to injury, July 22-23, I. B. Bender, Samuel Seltzer, $70; and complete denture construction impressions and registrations, August 4-6, Walter A. Hall, Jr., $90. Further information may be obtained from the division of postgraduate instruction, University of Southern California School of Dentistry, University Park, Los Angeles 7.

Temple • A course in dental roentgenology by Sidney Blackman of London is being offered October 12-13 by the Temple University School of Dentistry, Graduate and postgraduate division, Broad above Allegheny Ave., Philadelphia 10. Tuition is $50.

Washington • The University of Washington School of Dentistry has announced two evening seminars on fluorides in dentistry to be given September 12 and September 19, by David B. Law. Tuition for the two seminars will be $10. Further information may be obtained from the director, Postgraduate Dental Education, University of Washington School of Dentistry, Seattle 5.

Research

R. L. HAYES, DENTIST, NAMED TO CANCER CONTROL PROGRAM

Richard L. Hayes has been selected as a full-time dentist on the staff of the Cancer Control Program of the Public Health Service where he will aid in the development of an oral cancer control program. Dr. Hayes, a graduate of the University of Michigan School of Dentistry, was formerly a member of the Public Health Service's emergency plans and regional staff.

DENTAL RESEARCH BUILDING DEDICATED IN BETHESDA

The new building housing the laboratories of the National Institute of Dental Research was dedicated May 26, in Bethesda, Md., by Abraham Ribicoff,

secretary of Health, Education, and Welfare. Francis A. Arnold, Jr., director of the institute, presided, and Emory W. Morris, president of the W. K. Kellogg Foundation, gave the principal address.

Other participants included: Senator Lister Hill of Alabama; Representative John E. Fogarty of Rhode Island; Charles H. Patton, Association president; Surgeon General Luther L. Terry;

Abraham Ribicoff (bottom picture), Secretary of Health, Education, and Welfare, unveils name of new National Institute of Dental Research during dedication of the four-million-dollar building May 26. Others who participated in the ceremonies at Bethesda, Md., are (top picture, l. to r.) Harold Hillenbrand, secretary, American Dental Association; John W. Knutson, assistant surgeon general, chief dental officer, U.S. Public Health Service; Emory W. Morris, president, W. K. Kellogg Foundation; Francis A. Arnold, Jr., director, National Institute of Dental Research, and H. Trendley Dean, former director of the institute.

James A. Shannon, director of National Institutes of Health, and John W. Knutson, chief dental officer, Public Health Service.

ESHLEMAN NAMED TO NIDR TRAINING GRANT COMMITTEE

Jay H. Eshleman of Philadelphia has been appointed a member of the Training Grant Committee of the National Institute of Dental Research. Dr. Eshleman served as a member of the National Advisory Dental Research Council from 1958 to 1960 and has been a lecturer at Temple University School of Dentistry since 1948.

HAMPP AT NIDR RECEIVES GEORGETOWN AWARD OF MERIT

Edward G. Hampp, senior research associate of the American Dental Association at the National Institute of Dental Research, has been named recipient of the Georgetown University School of Dentistry 1961 Award of Merit. He received the award for "significant contributions to dentistry in the field of microbiology during the past 22 years."

Dr. Hampp, the first research associate at the dental institute was selected by the Association in 1941, seven years before the institute was established, to work at the then National Institute of Health in the field of microbiology as it pertained to ulcerative gingivostomatitis.

Edward G. Hampp

Dr. Hampp has degrees from Washington University's schools of dentistry (D.D.S.) and medicine (M.S.). He has served as head of the dental school's departments of general pathology and general bacteriology (1939-1941) and on the faculty of the medical school's department of general pathology (1940-1941).

General

PAN AMERICAN HEALTH GROUP TO BUILD NEW HEADQUARTERS

A permanent headquarters building for the Pan American Health Organization will be constructed in Washington, D.C., largely through a $3,750,000 grant from the W. K. Kellogg Foundation. Total cost of the building is estimated at $4,555,000. The organization's reserve funds plus proceeds from the sale of present headquarters facilities will cover expenses beyond the amount of the foundation grant.

The grant is being made on the condition that member governments of the organization appropriate through the Pan American Health Organization an equal amount to be used to expand or accelerate health programs in the Americas.

AUDIO ANALGESIA GROUP TO DISCUSS ROLE OF SUGGESTION

The American Association of Audio Analgesia will present a program on the role of suggestion in audio analgesia at the New York Academy of Sciences, October 9, at 8 P.M. Lecturer will be Aaron A. Moss; Jerome S. Mittelman will be the discussant.

The recently formed group has as its aim the study and investigation of clinical audio analgesia. Its officers are: Jerome S. Mittelman, president; Abbe J. Selman, vice-president; Herbert M. Felner, secretary-treasurer, and program committee co-chairmen, Aaron A. Moss and Nicholas G. Lignos.

American Dental Association members interested in joining the group, whether or not they use audio analgesia, may obtain further information from Dr. Mittelman, 30 E. 60 St., New York 22.

PERIODONTISTS CONFER ON BOARD SHIP TO BERMUDA

The American Academy of Periodontology will hold its forty-seventh annual meeting on board the *M. S. Bergensfjord,* sailing from Philadelphia October 20 to Bermuda and returning October 25.

A program has been planned which will cover all new advances in periodontal research and treatment. The ship will serve as the participants' hotel while in Bermuda.

Further information may be obtained from Mr. E. M. Baskette, Caribbean Cruise Lines, Suite 301, Roeper Bldg., Miami 32, Fla.

DENTAL ANESTHESIOLOGY SOCIETY TO MEET IN OCTOBER

The American Dental Society of Anesthesiology will hold its annual meeting at the Statler-Hilton Hotel in New York City, October 13-15. A scientific session, social events and a meeting of the house of delegates are planned. Further information may be obtained from J. D. Whisenand, 319 Bloomington St., Iowa City, Iowa.

ENDODONTIC PROGRAM TO BE PRESENTED OCTOBER FIFTEEN

An all-day endodontic program will be presented by the Philadelphia Endodontic Study Club, October 15. At the morning session, papers on the subject of "Clinical endodontic research" will be read. Following a luncheon, a panel discussion on the topic, "The control of pain in endodontics" will be presented. Fee, including luncheon, is $15. Send checks to: Morris Zitaner, 7244 Frankford Ave., Philadelphia.

FORM NATIONAL CONFERENCE OF HOSPITAL DENTAL CHIEFS

The Metropolitan Conference of Hospital Dental Chiefs declared itself a National Conference as of March 14, 1961. The first organizational meeting of the National Conference will be held during the annual meeting of the American Dental Association, October 1961, in Philadelphia. Further information may be obtained from Paul Scheman, 134 W. 58 St., New York 19.

J. S. OWENS, LIFE MEMBER, DIES IN PENNSYLVANIA

John S. Owens, 74, life member of the American Dental Association and former first vice-president, died in Medford, Pa., May 21. Dr. Owens had served as chairman of the local arrangements committee for the 1937 annual session of the Association and had been a delegate for 20 years. He was a past president of the New Jersey State Dental Society (1926) and the only member of the Southern Dental Society of New Jersey to have been elected twice as its president (1915 and 1922).

JAMES SHANNON, WM. WALSH RECEIVE HEALTH-USA AWARDS

James A. Shannon, director, National Institutes of Health, and William B. Walsh, founder and president, Project Hope, received this year's Health-USA awards at a June luncheon. The presentation was made by Janet Travell, physician to President John F. Kennedy, in the Mayflower Hotel, Washington, D.C.

The yearly event, designed to honor outstanding medical "statesmen," was sponsored by the Metropolitan Washington Board of Trade and the Medical Society of the District of Columbia.

C. Willard Camalier, assistant secretary of the American Dental Association, represented the dental profession on the planning committee for the luncheon.

COLLEGE OF DENTISTS TO MEET OCTOBER 15

The American College of Dentists will hold a convocation, October 15, at the Bellevue-Stratford Hotel in Philadelphia. The session will consist of morning, luncheon, afternoon and evening meetings. Meetings of the Board of Regents will be October 13-17.

FLUORIDATION PROHIBITION BILL DEFEATED IN FLORIDA

In Florida, a bill prohibiting fluoridation was defeated May 11 by a disapproving vote of the Committee on Public Health of the House of Representatives. The bill, introduced in the House April 21 and referred to the committee, would have prohibited municipalities from adding fluoride to public water supplies without the approval of voters in a special election.

DENTISTRY FOR CHILDREN MEETING IN PHILADELPHIA

The thirty-fourth annual meeting of the American Society of Dentistry for Children will be held at the Bellevue-Stratford Hotel, Philadelphia, October 13-15.

A closed circuit television program will be held on cleft palate treatment and there will be a panel discussion on growth patterns in children. Further information may be obtained from Manuel M. Album, A.S.D.C. convention director, Medical Arts Building, York Rd. and Hillside Ave., Jenkintown, Pa.

MILLEDGEVILLE, GA., VOTERS ENDORSE WATER FLUORIDATION

City voters of Milledgeville, Ga., endorsed fluoridation of their water supply by a vote of 339 to 88, almost a four to one majority. The City Council had required that fluoridation of water be approved by a two-thirds majority of the voters. This is the eleventh referendum in Georgia that has been passed in favor of fluoridation.

HONORARY ASSOCIATION MEMBER RECEIVES GOLD MEDAL

Irl C. Schoonover, honorary member of the American Dental Association and associate director of the National Bureau of Standards, has been awarded the U.S. Department of Commerce Gold Medal for Exceptional Service. Dr. Schoonover, a chemist, was chief of the dental materials section of the Bureau from 1945 to 1952.

Pictured during a farewell luncheon for Bruce L. Douglas as he left Okayama (Japan) University to become Fulbright Exchange Professor at Tokyo Medical and Dental University, are: Front row, from left—Prof. Hayashi, Dean Murakami, Dr. Douglas, President Yagi, Prof. Takahara, and Prof. Hamazaki. Back row, from left—Prof. Seno, Prof. Kodama, Prof. Jinnai, Prof. Sunada, Prof. Hashimoto, Prof. Kosaka, Prof. Inatomi, and Prof. Watanabe.

international dentistry

News from Great Britain

Royal Commission on Doctors' and Dentists' Remuneration • An editorial in the March 21 issue of the *British Dental Journal* on this subject has been condensed in the following.

The Representative Board, on March 4th, accepted the offer of the government to implement the Report of the Royal Commission, "as a whole, as it stands." The dental profession has justifiably criticised this report: it has a mass-production outlook and it is sufficiently ambiguous in places that the Minister and the association had to ask the chairman of the commission what precisely his report intended to convey.

The profession considers the interpretation to be neither logical nor just. However, the decision of the board was made after a long and detailed discussion and the resolution was carried by a large majority. From the point of view of dental remuneration, time may show that we are now at the end of an era.

Before the National Health Service was contemplated, various forms of remuneration under a national insurance scheme were debated by members of the profession, public administrators and actuaries. A scale-of-fees seemed to be the only possible method even though everyone recognised that it had its faults.

The scale has been plagued with difficulties and gross imperfections since its adoption and numerous Ministers of Health have chopped and changed it in an arbitrary manner to meet the current financial requirements of the government. However, by his acceptance of the Report of the Royal Commission, the Minister of Health has surrendered his right to make arbitrary changes in the level of remuneration.

The review body will decide where in the national economy the dental surgeon shall be placed and the Dental Rates Study Group will establish an appropriate scale of fees. It is hoped that this new arrangement will establish a greater sense of security within the profession than when remuneration was at the whim of the government of the day.

Public Dental Service • A report in the *British Dental Journal*, March 7, 1961, on the City of Birmingham Education Committee Annual Report 1959 contains the following statements:

"The City of Birmingham has an estimated population of 1,091,500 and a density of 21.34 persons per acre. It has 541 schools of all types accommodating upwards of 200,000 pupils. Mr. D. Glen Thomson, the Principal School Dental Officer, has on his staff the full-time equivalent of 19.6, which represents a slight decrease compared with 1958, for the dental care of more than 200,000 children.

"In the Birmingham dental service, 80 per cent of the dental staff is over 50 years of age. Young graduates show no tendency to be attracted to the full-time school service. Why should they, when a combination of general dental service and sessional employment can be more financially rewarding than the maximum earned by a full-time officer with many years experience?

"The statistics for a school dental service like Birmingham are bound to be not only impressive but shattering. Of the 134,507 children inspected in 371 schools, 89,321 were found to require treatment and 21,760 had their treatment completed. In addition, 18,061 casuals received attention."

While these figures emphasize the staggering incidence of this Disease, they also reveal that there is a leveling, if not actually a decline, in the incidence graph. Mr. Thomson, however, points to dental disease as the exception in an otherwise beneficent list of improvements in the general health structure. He writes of the nature of the problem and repeats what has been pointed out in every annual report for years.

There cannot be many local authority committees who are not well briefed as to the enormity of this wasteful, endemic, and largely preventable plague. How much longer must we wait for the news from Kilmarnock, Watford and Anglesey (the experimental centres of water fluoridation in the United Kingdom)?

The Practice and Craft of Dentistry • The following are excerpts from an article by James Scott in the *British Dental Journal*, June 7, 1960.

"The creators of national health dentistry . . . have produced an almost perfect scheme for bringing out the worst in human nature and ensuring that what is essential shall be sacrificed to what is most profitable. . . . They were not of course evil men—calculating evil implies a high degree of intelligence—they were merely confused men . . . men who tried to correct certain abuses in private prac-

tice dentistry by a process of bureaucratic tinkering. . . .

"The profession of dentistry, which should be . . . united in its dedication to the prevention, treatment and elimination of disease in the oral cavity, is today a house divided against itself. On the one side are the consultants, the hospital dentists, the instructors, the so-called specialists, and on the other the general practitioners. . . .

"In general practice the man who puts good work before work selected for its remunerative value will earn . . . less than his less ethical colleagues; but there is hardly any limit to the earnings of the man with a genius for making the best out of a situation conceived in confusion and dedicated to technique. . . .

"More blameworthy than (the creators of the present scheme) are the dental schools, the colleges and universities which produced them and which, by their teaching methods and examination system, perpetuate the scheme. Almost without exception, the examinations for the primary degrees and the higher diplomas put too high a premium on manipulative ability, the memorising of lecture notes and textbooks, and a superficial smoothness of personality. . . .

Furthermore, there is less and less place in the teaching of dental students for the man with dental practice experience. The student lives within a closed world of full-time academic teachers, full-time hospital clinicians, and full-time consultants, too many of whom . . . worship . . . individual glorification through the twin rituals of ultra-specialisation and technology. . . .

"What can be done? . . . It might be worthwhile . . . for those who are concerned . . . to form regional study groups where alternative schemes could be discussed not only in regard to dental practice but in relation to dental teaching and research as practised (in this country and the world). If this were done, perhaps the future teachers and leaders of the profession could produce a better state of affairs. It should not be difficult."

Dentistry in America • L. Oldham, a Rotary Foundation Fellow, has written an interesting article in the March 7 issue of the *British Dental Journal* on "Dentistry in America, 1960" and concludes with:

"Medical and dental treatment costs are high in America today. I sensed that the American public is becoming increasingly critical of such costs. Whether such a country, in which private enterprise is regarded of paramount importance, will accept national health services is a point of great contention. This question is further complicated by considerable professional opposition to such a scheme. The next decade or so may bring surprising changes to public and practitioners alike. In the meantime the dental profession, both vibrant and progressive, is held in high esteem by the American public."

The Second Conference on Dental Anaesthesia took place June 8-10 at the Eastman Dental Hospital, London, and a full program was presented of interest to all teachers of general and dental anaesthesia. *The Total Cost* of the National Health Service, from April 1960 to April 1961 (the financial year) will be approximately £865,000,000 of which approximately £665,000,000 will come from general taxation, the rest from National Insurance payments.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

News from Brazil

Dental School News • Professor D. Juchowski was appointed dean of the School of Dentistry, Catholic University of Rio Grande do Sul, for the period 1961-1963. Dean Juchowski is head of the department of dental materials and has taught at the school since its foundation in 1952.

The first class of 25 dentists graduated January 3 from the School of Pharmacy and Dentistry of Piracicaba, state of São Paulo. The ceremony was presided over by the dean of the school, Professor Carlos Henrique Robertson Liberalli.

Dr. Juscelino Kubitschek de Oliveira, who at that time was Brazilian President of the Republic, was the baccalaureate speaker at the commencement ceremonies of the School of Dentistry of the University of Minas Gerais. Luiz Gonzaga Borges spoke in the name of the graduating class.

At the graduation of the new dentists from the School of Pharmacy and Dentistry of Ribeirão Preto, Dean Francisco Degni presided. Professor Mario Ribeiro de Araujo, head of the department of pedodontics and orthodontics, was the baccalaureate speaker, and Valdir Domingos Vilela addressed the gathering in the name of the graduating class.

One hundred and six dentists graduated from the School of Pharmacy and Dentistry, University of São Paulo. Dean Prof. Antonio Adamastor Correia presided. Baccalaureate speaker for the dental class was Professor Guilherme Oswaldo Arbenz. Special honors were rendered to two other dental professors: Cervantes Jardim and Ciro Silva.

The federal government of Brazil has approved the plan of the dean of the University of Brazil, Dr. Pedro Calmon, to build several

schools and hospitals for the new university city. Among the approved schools to be erected for the approved sum of 20 million dollars is a school of dentistry.

Primary School Dental Service • With the sum of almost $150,000, arranged by its governor's plan of action, the state of São Paulo has reorganized and modernized its primary school dental program and opened 121 dental offices in primary schools of the capital and hinterland cities which need them most. Two modern offices, one in the city of São Paulo and one in Matão, were inaugurated in April 1960.

Public Health Dentistry • The January-February 1961 issue of the Journal of the Brazilian Dental Association (*Revista da União Odontológica Brasileira*) publishes an interesting report by Dr. Paulo da Silva Freire about public health measures in the cities of Aimorés, state of Minas Gerais, and Baxio Guandú, state of Espirito Santo. These cities are only six kilometers apart, in the valley of the Doce river.

In Aimorés, topical applications of a 2 per cent solution of sodium fluoride in distilled water were made to the teeth of children aged seven to eight years, their teeth filled or extracted as needed. Three hundred and eighty children were treated for five years, from 1952 to 1957. In 1957 at the ages of 12, 13 and 14, they had, respectively, 56 per cent, 61 per cent, and 71 per cent less tooth decay according to the DMF index.

In Baixo Guandú, fluoridation of the public water supply yielded a reduction of DMF teeth of 53.9 per cent for children aged seven at the end of five years of this program. The results in the other age groups were equally impressive. These studies will continue and their results published periodically.

Public Water Fluoridated • As of May 1960, 17 cities of the state of Rio Grande do Sul had their public water supplies fluoridated with sodium fluosilicate. They are Alegrete, Bento Gonçalves, Erechim, Farroupilha, Guaíba, Ijuí, Jaguarão, Montenegro, Novo Hamburgo, Passo Fundo, Rosário do Sul, Santa Maria, São Jerônimo, São Borja, Taquara, Triunfo and Vacaria. Of the over 260,000 inhabitants of these cities, more than 185,000 had the benefit of water fluoridation. Another 31 cities are qualified to start this public health measure, classified according to existence of public water supply, population, natural fluoride content of the water, and interest of the administration.

Welcome Visitor • John W. Knutson, chief dental officer, U.S. Public Health Service, visited Brazil in March and April. Dr. Knutson went to the research cities of the valley of the Doce river, as well as to Rio de Janeiro and São Paulo.

Absurd Project of Law • All Brazilian dentists and dental associations are united against the project of law presented by Norberto Schmidt to the Federal House of Representatives. This project would grant permission for the practice of dentistry to "dental practitioners," that is, to nonqualified personnel who had not taken a university course. All dental associations are actively fighting against this monstrosity, and clarifying public opinion about its possible pernicious effects.

Brazilian Dental Association • The Brazilian Dental Association has requested all its affiliate associations to send information regarding the exact date of their foundation as well as the number of their members. The latter is to answer an inquiry made by the Fédération Dentaire Internationale. The association is also planning a national "campaign of dental hygiene," which will benefit not only the dental profession but all the country's population.

The Associacão Odontológica Espiritossantense • The Dental Association of the state of Espirito Santo, located in Vitória, has asked permission to hold its first state dental convention, February 9-13, 1962, after 18 years of existence. The tendency of the Brazilian Dental Association is to grant its consent.

Hans Freudenthal, C.D.

News from Australia

Permanent Secretariat for Association • The federal secretariat of the Australian Dental Association has been established and John M. Newton, B.D.S., has been appointed secretary. An assistant staff also has been named. The *Australian Dental Journal*, the official publication of the Association, is now published from the same address, T. & G. Building, 49 Park St., Sydney, New South Wales.

The headquarters, attractively furnished and decorated, will provide a centrally situated location for the transaction of the business and growing activities of the Association. It marks an important milestone in the history of the profession in Australia.

Repatriation Dental Services • The Association has been engaged in collecting data re-

lated to the costs of practice and conditions involved in the provision of treatment by private practitioners, in order to prepare a memorandum on the revision of all fees and salaries for presentation to the federal government. A new scale of fees recently has been promulgated by the Treasury and became effective as from January 1, 1961.

Dental Health • Several mutual benefit organizations in different states have set up schemes for the provision of some forms of dental treatment to their members, and in one state a friendly society has planned to establish clinics in several cities.

World Health Organization • The Twelfth Session will be held in New Zealand, August 31-September 5, 1961. The Association has asked the Director-General of Health to approve the Association's plan to nominate a technical adviser to the Australian representative to this session. The Association considered that this request was important since the title of the session is "Dental Health."

Overseas Visitors for 1961 • The first of the overseas visitors to Australia was Professor Gösta Gustafson of the Royal Dental School, Malmö, Sweden, who lectured to various state branches and at several dental schools. At Adelaide, he gave a lecture series covering oral and dental histopathology.

Guest Lecturer 1962 • Professor J. Osborne, University of Birmingham, United Kingdom, has accepted an invitation to visit Australia in 1962 as a guest lecturer in prosthetic dentistry.

Cadetships in Dentistry • Branches of the Armed Services, several state government institutions and other services have developed programmes of cadetships and traineeships, seeking to encourage enrollment in dental faculties and to provide assistance in the payment of fees and other expenses associated with university training courses. Living allowances are also to be paid. Provision is made for a bond to ensure completion of the course of study, and the acceptance of employment in the institution or organisation providing the financial assistance.

Standards of Dental Materials • The Standards Association of Australia, in cooperation with the Australian Dental Association and the Commonwealth Bureau of Dental Standards, has recently published additional standards for amalgam alloys, wrought gold, inlay casting golds, and alginate impression materials. Other standards are undergoing preparation.

Sixteenth Australian Dental Congress • The Congress Commission has its plans well advanced for the Sixteenth Congress which is to be held in Sydney, August 14-18, 1961. The New South Wales branch of the Association, the responsible branch for the organisation of the congress, is providing for an extensive scientific programme in which a number of overseas authorities are participating. Extensive preparations have been made for the televising of clinics and demonstrations, and a well-balanced programme has been planned. The major presentations will be given in the University of Sydney and at the United Dental Hospital, Sydney. *Robert Harris, M.D.S.*

News from Argentina

Foreign Students in Argentina • According to official statistics, the National University of Buenos Aires has the largest number of foreign students in Latin America. There are at present 65,000 students registered in the various colleges. Of these, 10 per cent are foreign: 2,500 Latin Americans and 3,000 Europeans. There should be additional encouragement to foreign students in our university, with particular emphasis on scholarships not only for the university but for special schools as well. Dentistry receives a small amount of such scholarship support.

Inter-American Sciences • Students should be advised that the science division of the cultural section of the Pan American Union has initiated publication of a bi-monthly bulletin entitled *Inter-American Science*. This publication is designed especially for those interested in science in Latin America.

Nutrition and Attendant Problems • The people of Argentina have an adequate basic diet item in their meat. Although it is true that certain dietary factors assure adequate nutrition for the prevention of dental caries, it is advisable always to study the fundamental conditions of each country. It is not enough to count on the efficiency of an artificial chemical element such as fluoride. In Argentina as in other Latin American countries it is still necessary to do a great deal of work before the people will accept such procedures. A very solid foundation, based on long experience and positive results which will dispel all

doubt, will be required before fluoridation is accepted. *Ricardo Augusto Crespi, D.D.S.*

College of Dentistry of Buenos Aires • The 1961 session of the college began in June. Among the leading full-time professors in the dental school are Dr. J. Erausquin, histology and embryology, and Dr. J. F. Guilenia Oribe, oral pathology.

Death of Dr. Ciro Durante Avellanal • Dr. Avellanal, former professor of pharmacology and therapeutics of the dental school of Buenos Aires, died at the age of 77. He had practiced dentistry for 50 years, specializing in oral surgery. He had written many books which were widely read among Spanish speaking peoples. They included: *Clinical Dental Therapeutics, Odonto Maxillary Surgery* and a *Dental Dictionary*. He was in charge of the publication of a work on dentistry which appeared in four volumes. He was also a past president of the Argentina Dental Association and the director of the Municipal Institute of Dentistry. He had contributed greatly to the prestige of the profession in Argentina.

Visit of Dr. John W. Knutson • Dr. Knutson, chief dental officer, U.S. Public Health Service, visited in Argentina April 8-12. He visited the National Hospital of Dentistry, the Public Health Education department, the School of Public Health, the University of Buenos Aires, the Pan American Health department, and the Argentina Dental Association.

Juan Chaneles, C.D.

International News in General

PHILIPPINE DENTAL ASSOCIATION HONORS GERVASIO A. ERAÑA

Gervasio A. Eraña was honored by the Philippine Dental Association at its annual meeting, May 13, for his contributions to the cause and progress of Philippine dentistry during the past 43 years.

Born in Bustos, Bulacan, in 1889, Dr. Eraña started his professional life as an elementary school teacher. While teaching, he studied for his Licentiate in Arts from the National Academy in Manila and then studied law for three years. He gave up law on a matter of principle and instead studied dentistry at the Liceo de Manila dental school, now the Philippine Dental College.

He was one of the first Filipinos to graduate with the degree of Doctor of Dental Surgery in 1916. In that same year, he topped the examinations for dentists.

Dr. Eraña opened a dental clinic and from 1918 to 1924 he taught at the Philippine Dental College. He helped to establish a new dental college, the Educational Institute of the Philippines, and in 1934 he retired from teaching.

Gervasio A. Eraña

Dr. Eraña served as a member of the Board of Dental Examiners (1937) and as chairman of the board (1949, 1950). He is a past president of the Philippine Dental Association and the Philippine Association of Boards of Examiners. He has been a technical adviser on dental education and hygiene to three past presidents of the Philippines.

The dental association honored Dr. Eraña once before, in 1958, when it named him the most outstanding dentist of the century. The alumni of the Philippine Dental College named him the most distinguished alumnus in 1934 and 1950. And the college, itself, in 1960, cited him as its most distinguished alumnus during its 47 years of existence.

He is the first and only Filipino and one of only two Asians to be elected an honorary member of the American Dental Association. He is a master of the International College of Dentists, U.S. section, and is a regent of section 30.

MEXICO CITY NOVEMBER HOST FOR MEXICAN DENTAL CONGRESS

The sixth biennial National Dental Congress sponsored by the Mexican Dental Association will be held at University City near Mexico City, November 19-23. There will be forums, panel discussions and seminars. Translations from English and Spanish will be provided. The cost of registration for dentists is $12.

Registration can be made by writing to Dr. A. Chisikovsky Perkis, congress treasurer, Asociación Dental Mexicana, Sinaloa No. 9, México 7, D.F., Mexico.

reports of councils and bureaus

Dental school freshmen, 1951-1960

COUNCIL ON DENTAL EDUCATION

With considerable attention being paid to the recruitment of dental students and with the establishment of new dental schools, there is always a demand for data describing the student population in the dental schools. The accompanying tables have been prepared to describe the size of the dental school freshman classes for the past ten years.

Careful selection of dental school freshmen and high standards of teaching are the reasons that only about 7 per cent of the beginning freshmen are lost in the four years of dental school for scholastic reasons. Some 15 years ago, before the advent of aptitude testing, a high percentage of students was lost with one or two schools losing about half of their freshman classes. Today, with the dental aptitude test as one of the principal criteria for admission of students, the average loss for scholastic reasons is about 3 per cent, with another 3 to 4 per cent lost for other reasons.

A study of Table 1, distribution of freshman dental students by state of residence, shows that the largest number of students for each of the last ten years has come from the state of New York with the second largest number for each of these years enrolling from California. In 1960, Ohio, Illinois and Pennsylvania, respectively, supplied the third, fourth and fifth largest number of beginning students. A related study shows that about 50 per cent of the 3,616 students in the present first year class come from the 14 middle east and central states. In the same geographic areas are located 24, or a little more than 50 per cent, of the present accredited dental schools. A comparison of the number of students by state of residence in the first year dental school classes in 1951 and in 1960 shows an increase in enrollment from 34 states, the District of Columbia and Puerto Rico—the increase varying from 1 to 500 per cent.

At present there are 47 accredited den-

Table 1 • Distribution of freshman dental students by state of residence

Residence	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Percentage increase or decrease (—) 1951 and 1960
Alabama	51	45	49	49	62	60	64	50	53	57	12
Alaska	1	1	0	*	*	*	*	3	2	2	100
Arizona	8	16	25	21	16	21	28	33	26	23	188
Arkansas	19	20	35	45	44	36	30	33	29	35	84
California	225	231	246	274	287	299	306	353	326	361	60
Colorado	25	23	26	23	20	31	29	35	26	38	52
Connecticut	63	50	46	48	59	45	52	48	40	39	—38
Delaware	6	9	3	7	14	4	7	11	10	7	17
District of Columbia	26	27	23	25	24	23	22	25	26	28	8
Florida	63	50	63	71	56	59	66	90	74	84	33
Georgia	41	34	35	30	42	40	49	49	54	39	—5
Hawaii	24	36	24	*	*	*	*	*	27	15	—38
Idaho	18	22	25	32	26	28	27	37	29	22	22
Illinois	183	170	167	170	183	176	183	160	176	211	15
Indiana	75	71	69	70	75	74	79	77	93	87	16
Iowa	62	53	56	54	62	67	66	63	64	50	—19
Kansas	30	29	32	31	34	44	45	48	49	45	50
Kentucky	50	56	39	55	45	47	47	53	47	46	—8
Louisiana	38	40	32	45	42	37	54	35	42	48	26
Maine	8	10	11	13	13	12	14	6	3	4	—50
Maryland	38	39	34	40	40	38	44	56	55	59	55
Massachusetts	78	98	113	94	97	108	120	129	105	117	50
Michigan	152	186	168	170	173	183	191	178	168	176	16
Minnesota	83	73	81	80	79	95	93	85	81	84	1
Mississippi	21	31	29	38	27	37	26	35	28	24	14
Missouri	64	48	58	50	49	55	54	32	50	41	—36
Montana	16	13	22	20	32	23	21	23	20	11	—31
Nebraska	30	34	37	27	37	30	28	36	30	29	—3
Nevada	2	5	7	5	4	4	5	3	7	8	300
New Hampshire	10	13	9	15	13	12	12	8	8	10	0
New Jersey	94	112	105	119	105	130	132	141	130	142	51
New Mexico	6	7	4	6	13	12	7	7	16	14	133
New York	268	372	390	372	410	420	374	377	405	420	57
North Carolina	57	55	86	54	65	68	68	66	57	64	12
North Dakota	7	9	12	10	9	6	8	17	12	11	57
Ohio	182	186	159	175	190	182	195	198	224	223	23
Oklahoma	42	31	53	48	44	39	41	49	42	54	29
Oregon	39	54	57	64	63	68	77	70	69	60	54
Pennsylvania	200	205	209	197	202	231	228	205	211	190	—5
Rhode Island	14	17	10	12	13	13	14	8	5	18	29
South Carolina	11	25	19	32	33	40	32	45	39	42	282
South Dakota	7	14	17	15	13	6	15	13	14	13	86
Tennessee	65	130	81	87	92	68	70	72	72	66	2
Texas	103	123	126	121	152	164	163	174	171	163	58
Utah	52	54	48	81	61	68	41	53	49	58	12
Vermont	9	2	8	4	5	4	8	4	6	6	—33
Virginia	59	63	56	63	67	70	66	56	75	58	—2
Washington	71	71	75	77	78	82	79	73	62	62	—13
West Virginia	33	23	32	24	27	35	47	38	35	26	—21
Wisconsin	97	77	73	72	78	88	73	56	57	67	—31
Wyoming	8	10	10	17	8	11	12	8	13	9	13
Puerto Rico	4	7	14	*	*	*	*	31	28	24	500
Other U.S. Possessions	0	0	0	61	43	41	56	24	1	0	0
Canada	9	9	10	7	10	13	13	8	11	6	—33
Other countries	9	18	8	9	9	14	19	19	21	20	122
Unknown	304	37	48	0	0	0	0	0	0	0	0
Total	3,260	3,244	3,274	3,329	3,445	3,561	3,600	3,607	3,573	3,616	11

*Included in other U. S. possessions.

tal schools located in 26 states, the District of Columbia and Puerto Rico. The University of Kentucky will accept its first freshman dental class in the fall of 1962. The forty-ninth dental school is presently being planned for California and the Oklahoma State Legislature has passed a bill which would establish a dental school in that state. Distribution of freshman dental students by dental school, Table 2, shows New York University with the largest first year enrollment each year for the past ten years, with the University of Pennsylvania, or the University of Ohio showing the second largest enrollment for the same decade. The tables show enrollment data as of October 15 in any year. For all schools admitting one class during the calendar year and without an accelerated program, this permits comparisons of class size. In the case of the University of Tennessee which admits about 36, four times a year, it means that there are actually 144 freshmen during a calendar year even though there are only 108 on October 15. Similarly, this school would graduate four classes during a calendar year, or the third largest total class. Three of the schools have the same enrollment in 1960 as they had in 1950: the State University of Iowa, Creighton University and Columbia University. Twenty-five of the schools have shown an increase in the size of the most recent class as compared with the size of the first year class ten years ago. Approximately one third of the dental schools are located in the five states of Pennsylvania, California, Illinois, Kansas and New York with the schools of Pennsylvania and California, respectively, enrolling the first and second largest class of freshman students in 1960. In 23 of the schools, 75 per cent or more of the members of the present freshman class have come from the state in which the school is located. The percentage of in-state students is in some cases controlled by state law.

Other vital statistics for the dental school freshmen during the past ten years are presented in Table 3. Line 1 of this table shows a very gradual increase in the average age of the first-year student from 23.2 years in 1951 to 24.1 in 1960. Fifty-three students came in the age range of 35 and 42, the upper limit for the 1960 class, as compared with 32 students over 35 last year and 24 the preceding year. The 22 and 23 year age groups accounted for 46 per cent of the class with about the same number of each age, whereas two years ago more students were in the 21 year age group. Thirty-eight students came in the 19 and 20 year old group in 1960. The increase in the average age may be due in part to two factors, one that precollege schools do not appear to be using accelerated programs as extensively as in the past and more students are spending some time in employment between predental and dental school.

The percentage of married first-year dental students during the past ten years reached a low in 1953 (also a low year for the average age), a high in 1957, and has shown a continuing decrease since that year (Table 3, line 2). As might be expected, the increasing length of time since the war years has brought a decrease in the members of the first year class who are veterans, with a low in 1960 for the ten-year period of 19.6 per cent as compared with the high of 38.1 per cent in 1951.

About 30 per cent of the 1960 freshman class entered dental school with only the minimum of two years predental work which is required by the Council on Dental Education. Thirty-seven of the dental schools use the two-year minimum requirement, while ten of the schools require three years of predental schooling. The percentage of students entering this year's class with a bachelor's degree is 28, a drop of almost 17 per cent over the 1951 figure (Table 3, line 4). This ten-year downward trend in securing more than the minimum education requirement may be expected to continue unless there is an unusual change in the eco-

Table 2 • Distribution of freshman dental students by dental school

State	Dental school	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	Percentage increase or decrease (—) 1951 & 1960	Percentage of 1960 class from own state
Alabama	University of Alabama	51	51	52	52	52	52	53	53	53	52	2	89
California	College of Physicians & Surgeons	54	54	54	54	55	60	60	60	58	59	9	88
	University of California	60	60	60	71	76	74	75	74	72	75	25	92
	University of Southern California	106	105	105	105	104	105	105	105	105	105	—1	86
	College of Medical Evangelists	—	—	42	47	50	51	60	61	60	57	—	84
District of Columbia	Georgetown University	104	96	99	99	110	115	81	88	86	106	2	17
	Howard University	50	52	50	51	52	52	72	82	79	79	58	8
Georgia	Emory University	80	82	80	80	83	84	84	83	84	83	4	31
Illinois	Loyola University	90	94	93	95	90	88	92	99	97	100	11	66
	Northwestern University	109	101	93	93	87	89	89	81	69	61	—44	26
	University of Illinois	80	80	70	71	80	91	91	90	90	89	11	91
Indiana	Indiana University	69	70	65	65	69	69	72	81	89	91	32	91
Iowa	State University of Iowa	55	55	54	54	55	55	55	55	54	55	0	78
Kentucky	University of Louisville	62	62	58	62	62	59	62	64	61	58	—6	76
Louisiana	Loyola University	52	53	54	54	54	54	56	56	56	56	8	73
Maryland	University of Maryland	110	110	110	109	110	109	101	103	97	100	—9	49
Massachusetts	Harvard School of Dental Medicine	16	12	15	14	16	14	16	16	12	11	—31	82
	Tufts University	91	91	91	98	99	100	101	103	100	103	13	56
Michigan	University of Detroit	72	72	72	74	72	73	78	79	78	79	10	92
	University of Michigan	97	96	95	96	96	95	95	95	96	98	1	86
Minnesota	University of Minnesota	103	97	101	101	103	107	108	103	104	104	1	78
Missouri	St. Louis University	76	80	83	78	76	80	57	33	31	63	—17	18
	University of Kansas City	108	105	112	115	122	119	114	115	116	117	8	14
	Washington University	52	52	50	52	52	52	52	51	48	47	—10	17

Nebraska	Creighton University	46	46	46	46	46	46	46	46	46	46	0	24
	University of Nebraska	32	32	33	32	33	34	34	34	35	34	6	53
New Jersey	Fairleigh Dickinson University	—	—	—	—	—	46	48	48	48	49	—	51
	Seton Hall University	—	—	—	—	—	38	44	43	36	41	—	49
New York	Columbia University	40	41	40	42	40	40	40	40	40	40	0	90
	New York University	150	150	150	150	170	170	168	170	168	170	13	88
	University of Buffalo	64	66	63	61	68	68	64	61	67	66	3	96
North Carolina	University of North Carolina	40	44	50	50	50	50	50	50	50	50	25	90
Ohio	Ohio State University	120	119	120	120	120	120	128	138	150	150	25	100
	Western Reserve University	60	60	60	59	60	69	62	62	62	62	3	65
Oregon	University of Oregon	80	77	75	77	80	80	80	79	80	76	−5	78
Pennsylvania	Temple University	132	130	129	132	132	131	131	130	128	128	−3	46
	University of Pennsylvania	139	138	139	138	140	137	141	138	130	136	−2	29
	University of Pittsburgh	96	96	96	96	96	96	96	96	96	94	−2	82
Tennessee	Meharry Medical College	36	35	26	36	36	36	35	27	37	20	−44	15
	University of Tennessee	114	108	104	108	110	101	101	107	106	108	−5	54
Texas	Baylor University	60	64	80	84	84	84	84	85	85	85	42	65
	University of Texas	62	67	61	60	90	100	100	100	100	100	61	100
Virginia	Medical College of Virginia	53	53	54	55	75	78	80	80	80	80	51	56
Washington	University of Washington	75	74	76	78	75	75	65	64	67	72	−4	69
West Virginia	West Virginia University	—	—	—	—	—	—	30	33	26	22	—	77
Wisconsin	Marquette University	114	114	114	115	115	115	115	115	115	115	1	52
Puerto Rico	University of Puerto Rico	—	—	—	—	—	—	29	31	26	24	—	100
Total		3,260	3,244	3,274	3,329	3,445	3,561	3,600	3,607	3,573	3,616	11	

Table 3 • Other vital statistics for dental school freshmen

Year	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
1. Average age	23.2	23.1	22.6	23.8	23.4	23.5	23.6	23.4	23.4	24.1
2. Percentage married	21.5	20.5	19.1	22.8	24.0	25.6	27.7	24.4	24.3	22.5
3. Percentage veterans	38.1	28.2	23.9	28.5	35.5	35.0	35.1	29.6	25.2	19.6
4. Percentage with Baccalaureate degree prior to enrollment	44.8	36.1	34.4	35.8	36.2	34.5	30.4	31.0	29.9	28.0
5. Percentage of women	0.3	0.6	0.7	0.5	0.8	0.6	0.6	0.6	0.7	0.5
Number of women	10	19	23	17	28	22	22	23	26	17

nomic factors involved. Approximately 1 per cent of the present class had earned graduate degrees which is a slight increase over last year.

The number of women in dental school continues low. Total enrollment in 1960 showed 88 women, 17 of whom were in the first year class.

The American Dental Association has recognized the need for a program which will continuously educate well-qualified young people to the opportunities of dentistry as a profession. A population which is increasing at a greater rate than is the number of dentists offers every reason for the members of the profession to encourage capable young people to enter the field of dentistry. Recent figures show that more students who are now studying dentistry are doing so because of the influence of some dentist than because of the interest shown by any other individual in the student's life. This individual influence, with the combined efforts of organized dental agencies, may well be responsible for the fact that the number of students taking the dental aptitude test during the 1961 sessions has shown the first, even small, increase in the past five years.

Association recommends more funds for dental research projects in dental schools and for federal, state, local public health projects

COUNCIL ON LEGISLATION

On April 20, C. Gordon Watson, assistant secretary of the American Dental Association, presented testimony before the Subcommittee on Labor, Health, Education and Welfare and related agencies of the House Appropriations Committee. The subcommittee is headed by Representative John E. Fogarty (D., R.I.). Dr. Watson was accompanied by Mr. Bernard J. Conway, assistant secretary of the Association for legal affairs and acting secretary of the Council on Legislation, C. Willard Camalier, director of the Association's Washington Office, and Mr. Hal M. Christensen, Washington counsel for the Association.

The Association's testimony stressed the need for additional funds for the following programs administered by N.I.D.R.: 3 million dollars more for research projects, 1 million dollars more for fellowships and 4 million dollars more for training grants. With these increases, the 47 dental schools would be the principal recipients of about 15 million dollars in grants for the year beginning July 1, 1961.

The Association's testimony also urged an increase of 2 million dollars for the Division of Dental Public Health and Resources to be spent primarily on aid to states and localities for fluoridation expansion, care of crippled children and care for the institutionalized and homebound aged and chronically ill.

Lester W. Burket, dean of the Dental School, University of Pennsylvania, testified on the same date before Representative Fogarty's subcommittee. Dr. Burket also recommended increases for the N.I.D.R. and public health grant programs. He was accompanied by Mr. Reginald H. Sullens, secretary-treasurer of the American Association of Dental Schools.

TESTIMONY ON FISCAL 1962 FEDERAL APPROPRIATIONS DENTAL RESEARCH AND PUBLIC HEALTH ACTIVITIES

I am C. Gordon Watson of Chicago, assistant secretary of the American Dental Association. Among the agencies under my direction are the Association's Council on Dental Health and the Bureau of Dental Health Education. The principal concern of both of these groups is bringing improved dental health to more people, principally by educating them to the value of the technics for preventing dental disorders. In addition to my career in administration, I have spent several years in the private practice of dentistry as a general practitioner in San Diego, Calif.

I am accompanied by Mr. Bernard J. Con-

way of Chicago, who is responsible for staff direction of the Association's legal and legislative affairs, C. Willard Camalier, director of the Association's Washington Office, and Hal M. Christensen, the Association's Washington counsel.

On behalf of the Association's 95,000 members, I wish to thank this Committee for its leadership in the advance of dental research and dental public health programs during the past five years particularly. The dedication of the National Institute of Dental Research building next month might still be years away if this Committee had not acted vigorously to bring forth the funds for this much needed facility.

The several agencies of the Association interested in research, particularly our Council on Dental Research, endorse the recommendations for increases in research support contained in this statement.

The Council on Dental Health has continually urged expansion of state and local programs for care of handicapped children and the chronically ill; both of these objectives are reflected in our recommended increase in support for the program administered by the Division of Dental Public Health and Resources.

The American Dental Association, therefore, recommends that the budget for the grant programs of the National Institute of Dental Research be increased by $8,000,000. This increase would add $3,000,000 to the research grants, $1,000,000 to the fellowship grants and $4,000,000 to the training grants. This would mean an increase in the total budget of the National Institute of Dental Research from $13,350,000 for fiscal 1961 to $21,350,000 for fiscal 1962.

The Association also recommends that $2,000,000 be added to the budget of the Division of Dental Public Health and Resources, principally for expansion of programs relating to dental care for the aged, chronically ill and institutionalized or homebound persons and handicapped children and programs concerned with fluoridation of community water supplies.

In the opinion of the American Dental Association the recommended expansion of dental research and dental public health programs is the minimum in terms of the national need. Unless we move quickly to expand existing programs for preventing dental disease and develop new preventive methods, we cannot keep pace with that need. Unless we can develop the services of dental auxiliary personnel and can train dentists to use these persons efficiently, we will lose ground.

Last year, before this Committee, the Association emphasized the growing severity of the dental manpower problem to indicate that the control of dental disease cannot be effectively met by reliance on even the most modern treatment technics. This story must be repeated until all interested agencies, including the federal government, provide the resources to meet the need.

APPROPRIATIONS FOR NATIONAL INSTITUTE OF DENTAL RESEARCH

Importance of Research and Prevention • We are faced with a progressively widening gap in the ratio of dentists to population and, even assuming the establishment of several additional schools of dentistry, the rate at which dental practitioners can be trained and graduated will not approximate the projected rate of population growth. Thus, unless new methods of preventing dental disease can be found and unless existing dental manpower and facilities can be used on a broader and more efficient basis, there will be a constant increase in the amount of untreated dental disease and a steady decrease in the availability of dental treatment and care over many years to come.

There can be no reasonable disagreement over the fact that in relation to the magnitude of the dental disease problem, the public and private expenditures for dental research are woefully small. The yearly bill for dental care in this country is about 2 billion dollars, which is only a fraction of the total economic loss involved and represents treatment and care for less than half the people who need it.

Yet, despite the huge financial losses, the pain and suffering involved and the deleterious effect on the general health and well-being of the public, funds available for research into the nature and causes of dental disease are not readily obtainable. This results in part from the fact that in the minds of many people, dental disease is a minor problem involving only an occasional toothache or other temporary discomfort; the dramatic characteristics that bring forth public and private philanthropy for diseases such as cancer, heart disease and mental illness are not present. This conception is unfortunate and to a large extent misguided. It overlooks the direct relation between oral health and many systemic conditions. It also overlooks the fact that there are many debilitating and sometimes fatal oral diseases which are being subjected to intensive study by researchers working in many different areas.

For example, more than 6 per cent of all malignancies occur in the throat and oral

cavity and many investigators in cancer research and dental research are engaged in studies that are complementary to each other. Similarly, subacute bacterial endocarditis following oral surgery is a serious condition of vital concern to both heart and dental research workers. Crippling congenital conditions such as cleft lip and palate receive the attention of teams of health scientists including dentists, plastic surgeons, speech therapists, radiologists and many others. Other oral conditions, injuries and diseases frequently involve disfigurements which have extremely serious psychological and medical consequences. Much of the research on caries and periodontal disease involves bacteriological studies that have broad application in many fields in addition to dental science.

The dental research involving periodontal disease is of exceptional public importance. It involves one of the most widespread infections known to man, and its effects on general health are barely beginning to be recognized. One writer has compared the oral tissues stricken by a common form of periodontal disease, or pyorrhea, to an area of 10 to 15 square inches on the back, arm, or other exposed part of the anatomy which emits pus constantly. He points out that periodontal disease afflicts 25 per cent of the adult population, causing untold systemic disturbances and accounting for the annual loss of millions of teeth. At the present time, some of the most promising research being conducted is in relation to periodontal disease. It is but one of the areas needing increased support and expansion.

N.I.D.R. Research Grants in Nondental Institutions • The program of the National Institute of Dental Research has contributed significantly to new knowledge and understanding of the causes of oral disease and the relation of oral disease to general health. This is especially true of the studies that are being made in the areas of genetics, oral diagnosis and bacteriological studies, including experiments with germ-free animals. The progress that has been made in the last two years is not only remarkable in the positive gains from N.I.D.R. projects. There are also many new leads that must be explored.

Last year, the Association stressed the desirability of expanding dental research into science departments of liberal arts colleges so that basic science explorations could be advanced, much of this being based on the knowledge only recently uncovered by researchers in the dental schools.

Dental research talent naturally has concentrated in the dental schools where for years individuals have been highly trained for teaching; and it is only logical that the schools should be the primary source of progress in dental research. In turn, the financial support that has been made available for research in the schools has strengthened them and raised the general caliber of the dental education provided.

There is a great need for research inquiries that are prompted by pure scientific curiosity about phenomena in the dental field without foreseeable relation to any clinical problem or condition. These can be conducted by competent scientists with no prior connection with dentistry. There are large numbers of such scientists in liberal arts colleges and technical institutions all over the country who could be brought into this important research endeavor. With very little guidance and assistance, this virtually untapped reservoir of highly competent and qualified manpower could be utilized in health related research.

Already, there are dental research projects in nondental institutions such as Stanford University, Western Biological Laboratory, Chicago Children's Memorial Hospital, Illinois Wesleyan University, Michigan State University and others. There are many nondental institutions equipped to conduct dental research. An effort should be made to treble the number of projects now under way in nondental institutions.

Dental Research in Regional Clinical Research Centers • Last year the Association urged that consideration be given to the development of centers where specifically oriented laboratory research, clinical studies and rehabilitation in dentistry could be carried on. We pointed out that the condition known as cleft palate or cleft lip would lend itself well to this approach. At present, there is a pitiable insufficiency of research on and specialized treatment available for this condition which occurs at the rate of 1 in every 800 live births. There are now approximately 250,000 persons so afflicted in America with 5,000 new ones being added each year. We renew this recommendation and we solicit from this Committee a specific request in its report that N.I.D.R. undertake establishment of clinical research centers for study and rehabilitation of persons suffering from dental handicapping conditions.

The Association renews its recommendation that there should be participation by dental scientists in the cooperative utilization of the clinical centers which we understand are being established by N.I.H. in various parts of the country for metabolic and other special studies. Such centers would provide outstanding opportunities for investigating dental problems

and pathologic changes in health and disease under ideal conditions of study. Some of dentistry's greatest contributions to health may be expected to arise from cooperative teamwork of dentists, physicians and basic scientists in centers like these.

There is special need for the cooperative approach in research relating to periodontal diseases which affect and are affected by various systemic conditions that are under the treatment and control of physicians. These include such conditions as diabetes, pregnancy, menopause, cardiovascular disease and blood dyscrasias. Dentally oriented studies conducted simultaneously with medically oriented studies of diabetic patients at the regional metabolic disease centers would be of great value and would conserve facilities and reduce duplication. Studies of bacteremia obviously could be performed with great benefit and efficiency under similar circumstances. Many other vital research projects lend themselves advantageously to the multi-disciplinary approach.

Recent Progress in Dental Research • The need for expanding the sources for conducting dental research does not mean that current efforts are disappointing. The opposite is true. In fact, it is the remarkable gains from ongoing projects that dictate the need for exploration into the many and varied promising leads already uncovered. This dramatic advance, mostly in the last two years, can best be appreciated by reviewing a few of the many outstanding projects being supported by N.I.D.R. grants.

Dental Caries • The scientific breakthrough reported last year from the N.I.D.R. with respect to the transmissibility of decay in animals has been followed by a number of developments elsewhere.

It will be recalled that the N.I.D.R. investigators demonstrated that caries would occur in hamsters, which had hitherto been considered resistant through many generations, if they were infected with certain microorganisms from caries-susceptible animals. Other investigators are studying this phenomenon in various strains of rats. The implications of the findings in terms of human health deserve intensive exploration. If it is found that dental caries is also transmissible in humans, a whole new concept of preventing the disease through preventing its spread may come into being.

At the Forsyth Dental Infirmary and the Harvard School of Dental Medicine in Boston studies have been initiated to explore the transmissibility concept in man. Preliminary investigations have compared the bacteria present on tooth surfaces of patients with and of those without tooth decay. It was found earlier that certain oral bacteria are able to store a portion of the sugar ingested while eating and are later able to convert this stored reserve of carbohydrate into decay-producing acids during the period of time between meals. The investigators found almost twice as many bacteria of this category on the teeth of patients with tooth decay. The premise that these bacteria may be involved in the transmission phenomenon is now being tested experimentally with hamsters obtained from the N.I.D.R. strain. This work goes hand in hand with recent studies by the original investigators at N.I.D.R. who have now developed technics for inoculating newly weaned hamsters with dental plaque and decayed tooth material from animals with the disease; rampant dental decay follows within six or seven weeks after the inoculation. Uninfected animals developed no dental caries. Studies aimed toward identification and isolation of the causative organisms are in progress.

Dental Caries and Blood Groups • Another attack on the epidemiology of dental caries is getting under way at Baylor University. For years it has been known that certain people have an apparent immunity or at least a strong resistance to caries, which may be carried hereditarily. Up to this time, there has been no conclusive pinpointing of any physical or physiological characteristic that might consistently be related to the caries-resistance phenomenon. With the development of refinements in the typing of blood groups and secondary serological factors, a search is now being undertaken for a correlating link between the presence or absence of certain blood group factors and resistance or susceptibility to dental decay. The success of this survey may shed considerably more light on our knowledge of the genetic patterns which may be involved and can lead to a better understanding of factors which influence the epidemiology of dental caries. If the study turns up no conclusive correlations, it will at least have served to clear up an area which has hitherto given rise to much speculation.

Extension of this line of investigation to larger population groups will provide a larger pool of data from which conclusions may more reliably be drawn, and the studies in this field deserve further support.

Fluoride • In studies of the crystallization of the mineral portions of the teeth and bones, it has been shown that as little as two tenths of a part per million of fluoride can significantly influence the formation of hydroxyapatite—the main form in which calcium and

phosphorus occurs in these body structures. Fluoride increased the rate of crystallization, whereas other elements such as magnesium depressed the rate. These studies, performed in the test tube, may throw additional light on the mechanism by which fluoride builds caries-resistance into the teeth during the period of their formation. It may also provide insight into conditions under which recrystallization of dissolved minerals can be accomplished in the carious lesion. The ratio in which fluorine and magnesium occur in teeth may be a determinant in regard to their resistance to decay.

Coupled with this study, which is being conducted in Boston, is an investigation which indicates that the presence of a few parts per million of fluoride ion in solutions of acids which dissolve teeth retards the rate of dissolution as much as 40 per cent. The attack on this phase of the fluoride picture is at a fundamental level of scientific investigation and should be pursued more vigorously in the next few years.

Statistical and methodological studies are being conducted with a view toward eliminating errors and sharpening the precision with which clinical studies of dental caries can be performed. This work, by improving the sensitivity of our ability to detect differences between control and experimental groups of subjects, can be expected to yield more accurate information and to disclose new leads in the search for caries preventive agents for public use.

Cancer from Oral Irritants • It has long been held that irritation of the soft tissues of the mouth by sharp edges of advanced cavities in the teeth or by broken fillings or appliances gives rise to the production of a malignant lesion at the site of the irritating agent. The belief is supported by the fact that in many cases the lesion and the source of irritation have been found together. Recently, a technic has been developed which will permit direct exploration of this finding on an experimental basis through the use of animals. A group of dental investigators at Tufts University School of Dental Medicine determined conclusively that chronic irritation hastens the occurrence of chemically induced cancer in the hamster. The effect of a carcinogen (9, 10-dimethyl-1, 2-benzanthrene) on the inside of the cheek was compared with the effect of the same carcinogen coupled with the irritation produced by a wire which was tied around a molar tooth and which projected into the cheek. The significance of this study is that it adds confirmation to the role of irritants in inducing cancer and provides an experimental tool for the pursuit of more fundamental information about this relationship. From this line of research may come important new leads toward the explanation and ultimate prevention of the development of malignant growths in the oral cavity and elsewhere.

Cancer Detection • A painless and practically reliable method for early detection of mouth cancer has been tested successfully at Columbia University. Examination of the cells of tissue lining the mouth and upper throat can pinpoint cancer before it is suspected on the basis of clinical examination. Scrapings taken from the mouths of patients are examined by special staining methods which will reveal cells characteristic of malignancy if cancer is present. The method correlates with 91 per cent of cases diagnosed by surgical biopsy, and it detected cancer in many instances where a biopsy would not ordinarily have been performed on the basis of the clinical picture. This method will certainly help to reduce the toll from oral cancer which now accounts for upwards of 6 per cent of malignant lesions; two out of three persons affected by mouth cancer die of the disease within five years, although the probability of curing early cancer is in the order of 90 per cent.

Allergy and Dental Defects • Children with early-appearing allergies also often have defective enamel of the deciduous teeth. It has been observed previously that children with cerebral palsy have a higher than normal incidence of enamel defects and there is evidence that other developmental aberrations or systemic disturbances are positively correlated with defects of the enamel. In San Francisco, a study of children with asthmatic or upper respiratory distress symptoms, generalized eczema or other specific allergic responses revealed a positive enamel defect in 58 per cent of the cases. This figure is nearly ten times higher than the 6 per cent frequency with which enamel defects are observed in the general population. The investigators suggest that possibly the allergen or the allergic response in the children was sufficiently disturbing as to interfere with the metabolism of the developing cells that form the enamel. Localization of most of the enamel defects in certain teeth provides a clue to the time at which the exposure to the allergen occurred. Moreover, the use of the site of enamel defect to time the onset of allergic reaction may be of clinical significance in diagnosis. Where complete prenatal histories are available a differential diagnosis may be made, possibly definitive enough to include the inciting allergen. Study of dental defects in relation to other diseases

may give insight into the causes and prevention of either condition and this promising line of investigation deserves continued and expanded support.

Bone Metabolism • An unknown diffusible substance has been discovered, by dental workers, which stimulates the formation of new bone. By transplanting bone tissue encased within a capsule made of thin porous filters which do not permit the passage of cells, it was shown that new bone forms both inside the capsule and outside of it in the host tissue surrounding the implant. The importance of this fundamental finding will be apparent to scientists in all fields who are working on problems related to the growth, transplantation, grafting and healing of bone. Its importance to the study of the repair process in fractures and in the treatment and prevention of periodontal disease is clearly evident. This line of study deserves more intensive support.

New Surgical Technic—"Tissue Tacks" • An interesting example of the application of basic research to a practical clinical problem is in progress at Baylor University School of Dentistry in Dallas. When the gingival tissues must be turned back by the dental surgeon to permit certain operations for the removal of teeth, they are re-adapted to the bone and are held in place with sutures until healing occurs. If the reflection of tissues is extensive, it is often difficult to replace them in close contact with the bone at all points, since the sutures cannot be used to sew the soft tissue to the bone itself. As a result, the healing process may be retarded in such cases to a significant degree, with prolongation of the accompanying postoperative pain and discomfort.

Experiments with metallic devices have led the Baylor investigators to develop what may be called "tissue tacks." These are essentially like a tiny thumbtack in shape and are used literally to tack the soft tissue back onto the bone. At this stage of study, the investigators are reporting better adaptation of the covering tissues to the underlying structures, more rapid and less complicated healing and reduction in the duration and intensity of discomfort. The metal employed for making the tacks is well tolerated by the tissues, as shown by carefully conducted basic research. The procedure for producing a large quantity of tacks involved trials in the fields of metallurgy and engineering.

Genetics • A few weeks ago a symposium was held on genetics as related to dental health and disease. The symposium was sponsored by the American Dental Association and was supported in part by a grant from the N.I.D.R. The meeting brought together more than 100 geneticists, dental educators and research workers from four countries for the purpose of discussing recent advances in genetics, new methods of investigating heritable diseases in man, and inherited metabolic or physical defects. Much has been learned from dental studies of twins, for example. Defects of dentin and enamel have been traced through succeeding generations all the way back to certain families who came to this country on the Mayflower. The genetic background of people who are predisposed to the development of cavities and of bone and connective tissue disorders have been examined. The symposium summarized the status of present knowledge in these fields, provided a forum for the enthusiastic exchange of ideas between the experts and produced guidelines for future investigative work on many aspects of this complicated problem. Support will be sought for many of the studies that will shortly come into being as a result of the stimulation afforded by this conference.

The foregoing paragraphs outline but a few of many outstanding projects being carried on under the research program administered by the N.I.D.R. It is believed firmly that the program should be strengthened and expanded. For the research project grant program, the Association recommends an increase of $3,000,000 over the fiscal 1961 budget.

Training Grant Programs • Research efforts must not be viewed only in terms of projects. The most important element of an effective research endeavor is the trained scientist who spawns the ideas for new explorations into the unknown, who carries on the methodical investigations and faithfully compiles and reports his findings.

Dentistry needs more trained researchers, persons who will be oriented and dedicated to dental research. Where can these specialists be found? The dental schools are the chief source of training for dental scientists.

Since 1956, the dental schools have been greatly benefited by N.I.D.R. grants specially dedicated to the training of dental researchers and teachers. In the opinion of the American Dental Association, this program must be expanded if we are to enlist the faculty needed to staff not only replacements for today's 47 dental schools but also the vast majority of faculty for the several new schools now being established.

Two new schools, one in Los Angeles and the other in Lexington, Kentucky, are already seeking teachers and researchers. Within the

next five years we expect to see three more dental schools activated. If federal grants for construction of dental teaching facilities are approved, there might be as many as ten new dental schools within five years.

It is imperative that the training programs now established in the schools be expanded to at least five times their present capacities. It is equally imperative that substantial training grant programs be established in those schools which are planning to initiate such programs for the first time.

Training grant funds are also being used to train dental students to use dental assistants effectively. With this training, dental graduates should be able to increase substantially the amount of care they can provide. By the end of this year, there will be 40 schools engaged in N.I.D.R. supported programs for teaching students how to use auxiliary personnel effectively. Support from N.I.D.R., however, has only been moderate at best. In fact, several programs have only the minimum necessary to sustain a limited program. This result has come about because the funds available have been spread in order to cover moderate and minimal programs in 40 schools rather than to support fully programs in less than half of the 47 dental schools. It is urgent and critical that funds be provided next year to maintain adequate programs in all the schools for training students to use dental assistants. The gain from this program is more and higher quality care for the American people. It is the conviction of the American Dental Association that this training of students to use auxiliaries effectively is as important, and a much less expensive solution to the dental manpower problem, as the building of new schools to graduate more dentists.

The Association believes that $4,000,000 is the minimum needed for expanding the training grant programs in the dental schools.

Fellowship Grants • Students in dental school as well as graduate students are participating in the N.I.D.R. fellowship grant program. Both phases of this program have been successful beyond our expectations of a few years ago. The Association believes that the fellowship program should be considerably expanded to cover more persons in graduate study and, in particular, to include more career research professorships.

The testimony of the American Association of Dental Schools will describe in detail the vital necessity for expanding the number of career research professorships. Instead of six such professorships being supported there should be at least 20. For this program and for the other fellowships eligible for N.I.D.R. support, the Association recommends an increase of $1,000,000 over the fiscal 1961 budget.

APPROPRIATIONS FOR DIVISION OF DENTAL PUBLIC HEALTH AND RESOURCES

In addition to its interest in the expansion of the dental research effort, the American Dental Association is greatly concerned with the proper growth of programs administered by the Division of Dental Public Health and Resources. This year for the first time, these activities are receiving separate budgetary consideration and are identified in the Budget of the Public Health Service under the heading, "Dental Services and Resources."

Reference has been made to the vast dimensions of the dental disease problem in this country and the increasing gap between dental needs and our ability to meet them. Although the dental manpower shortage looms as the largest barrier to continued progress in dental health, there are other effective approaches to the alleviation of the dental health problem that are being ignored or receiving only token attention.

Preventive Procedures—Fluoridation • After years of research, painstaking testing and study, science has produced a marvelously effective weapon against dental caries, the country's most prevalent disease. This weapon, fluoridation of public water supplies, has been available for more than ten years, yet less than 25 per cent of the people are protected and most of these are in large cities. Only about 5 per cent of the towns of under 2,500 population are fluoridating their water supplies.

This deplorable situation exists despite the fact that the United States Government, through its Public Health Service, has had a forthright position in support of fluoridation since 1950 and despite the fact that virtually all leading private and public health agencies have accepted the scientific merit and safety of the procedure and have urged its adoption as an effective public health measure.

That the people of this country should be denied the benefit of this safe, economical, convenient, mass-preventive measure, is a national disgrace. The health professions, the federal government and all other interested private and public agencies have been remiss in their obligation to assume leadership in support of the fluoridation procedure. As a result of combined failures or combined apathy in responsible quarters, fluoridation

actually is losing ground; the proportion of the population not using fluoridated water is increasing.

One reason for the lack of advancement in fluoridation is the existence of a few vocal, well organized minority groups which have opposed fluoridation at every turn, using false and misleading statements and acting in total disregard of the abundance of research and scientific fact underlying the safety and efficacy of the fluoridation procedure. During the elections last November, these groups, having converted a health matter into a political controversy, compounded their success by defeating fluoridation in several communities where the question was on the ballot. Because of the misguided work of these minority groups, or because of a lack of information in the hands of the voters and the absence of responsible leadership, the measure was defeated in 16 out of 22 communities. In many other communities there was not sufficient interest even to create an issue.

The American Dental Association believes this problem is national in scope and requires for its solution a renewed and revitalized cooperative effort between national, state and local private health agencies, state and local public health agencies and the federal government. This Association currently is taking a critical look at its own deficiencies in this area and will establish new programs to extend the benefits of fluoridation. It is believed strongly that the United States Government through its Public Health Service has an obligation to take similar action.

The Association believes that the Division of Dental Public Health and Resources should be provided funds to undertake a number of co-ordinated and centralized programs designed to inform and educate people at the community level in the benefits of fluoridation and the means by which it can be made available to them.

For this purpose, the Association recommends an increase of $210,000 in the budget of the Division. It is believed that this amount is a small beginning toward acceptance of a sound public health procedure that will reduce the ravages of dental caries as much as 65 per cent and will return to the users of fluoridation 70 dollars on every dollar invested in it.

Dental Programs for the Aged, Homebound, and Institutionalized Persons • Although health care for the aged, chronically ill and other institutionalized or homebound persons has received a great amount of attention and discussion and has stirred political debate throughout the country, not enough consideration has been given to identifying specific needs of persons in these categories and assessing the availability and adequacy of personnel, facilities and resources to meet their needs. This situation is particularly true in the case of dental health care.

While preliminary studies have given some indication of the particular needs of the chronically ill and aged, considerable additional investigation is needed. At the present time it is estimated roughly that at least one third of the chronically ill and aged are in need of immediate dental care. Most, if not all persons in this category have special problems making treatment complex and uncertain. In many cases portable dental equipment and specialized treatment technics are essential. Unlike conventional dental care, treatment must be brought to the patient at the places where they reside, in their homes, in hospitals, nursing homes and other institutions. Few dental practitioners currently are trained to administer care under these exceptional conditions. The cost of such care is difficult to estimate and there is a lack of the coordinated programming at the community level which is needed to train personnel and make special facilities available.

It is believed that pilot projects should be initiated in several dental schools to develop undergraduate and graduate training programs related specifically to treatment technics for the institutionalized and homebound aged and chronically ill.

In addition there should be funds appropriated to permit cooperative community demonstrations of methods that can be used to solve the dental health problems of the institutionalized and homebound. There is a need also for workshops to be conducted by state and local health agencies to provide private practitioners of dentistry and health agency personnel an opportunity to become familiar with the special problems and treatment technics associated with dental care of the aged and chronically ill.

The Association believes there is much basic work to be done in meeting the dental care problems of the unfortunate people who, by infirmity of age or crippling disease, must be confined to their homes or to institutions. It is believed that a beginning toward solution of these problems should be made at once.

It is recommended that Congress appropriate $1,000,000 to permit establishment of a comprehensive program in this area.

Dental Care for Handicapped Children • Of equal seriousness with the dental care problem of the aged and chronically ill are the problems of providing dental services for hand-

icapped children. With one or two notable exceptions, the Association is not aware of any broadscale programs to develop means of providing dental services to children with physical or mental debilities. While it is estimated that there are nearly 15 million children in the country today who are suffering from physical or mental disability, little is being done for their dental problems on an organized basis. Despite the fact that there are now available advanced technics making it possible to provide dental care to afflicted children, slow progress is being made in transferring such technics into practical utilization.

A relatively small number of dental practitioners is trained adequately to treat children with severe conditions, facilities are lacking, and financial support of programs in this entire area is woefully inadequate. Failure to meet the dental health needs of these unfortunate children only serves to increase the pitiful burdens many of them must carry throughout their lives.

It is believed that allocation of funds to enable establishment of a number of pilot projects designed to serve as models for state and community programs would be extremely valuable and in the interest of the children involved and the public generally.

It is recommended that for these purposes $500,000 be included in the budget of the Division of Dental Public Health Resources.

Additions to the Library

BUREAU OF LIBRARY AND INDEXING SERVICE

The books listed here have been added recently to the Bureau collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing books, but there is a minimal charge of one dollar for each package library. Practically all the dental journals published in the world at present are available to members on loan. Lists of books and package libraries are available on request.

BOOKS

AUDIO-VISUAL EQUIPMENT DIRECTORY. 7th ed. Fairfax, Virginia, National Audio-Visual Association, 1961. 289 p.

AUSTERMAN, J. B. A study of the change of relationship of points A and B during orthodontic treatment with the multiphase appliance. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 35 p. Typewritten.

BERLINER, ABRAHAM. A disciplined approach for examination, diagnosis and treatment planning. New York, Park Press, 1960. 180 p. $5.50.

BERTOLDI, R. E. Infrared spectral characteristics of saliva collected from children classified as to caries experience. (M. S. thesis—University of Kansas City.) Kansas City, 1961. 39 p. Typewritten.

BORROR, D. J. Dictionary of word roots and combining forms; compiled from the Greek, Latin, and other languages, with special reference to biological terms and scientific names. Palo Alto, Cal., N-P Publications, 1960. 134 p. $2.

BREGSTEIN, J. S. Handbook for dental assistants, hygienists and secretaries. Englewood Cliffs, N. J., Prentice-Hall, 1961. 364 p. $6.95.

BRIASCO, GIOVANNI & PALAZZI, SILVIO. Prontuario di odontostomatologia; ad uso degli studenti di medicina. 4th ed. Pavia, Cortina, 1960. 377 p.

BRITISH DENTAL NURSES AND ASSISTANTS SOCIETY. Dental surgery assisting as a career. Leyland, 1960. 7 p.

BROWN, M. A. A study of the correlations of some vertical facial components to total

facial height in adult males possessing excellent dental occlusion. (M. S. thesis—University of Tennessee.) Memphis, 1958. 43 p. Typewritten.

CLARK, F. E. A comparative evaluation of fractures of the mandibular condyle treated by the open vs. the closed technic. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 75 p. Mimeo.

CROWDER, H. M. An evaluation of anchorage reinforced by the addition of tissue-borne acrylic to a maxillary lingual archwire. (M. S. thesis—University of Tennessee.) Memphis, 1957. 57 p. Typewritten.

ERICKSON, M. H.; HERSHMAN, SEYMOUR & SECTER, I. I. The practical application of medical and dental hypnosis. New York, Julian Press, 1961. 463 p. $12.50.

EUROPEAN ORTHODONTIC SOCIETY. Report of the thirty-fourth congress held at the University Institute of Medical Anatomy, Copenhagen, July 4th-8th, 1958. The Hague, 1958. 413 p. $12.

FORNEY, G. F. A clinical study of an orthodontic torquing mechanism. (M. S. thesis—University of Kansas City.) Kansas City, 1961. 40 p. Typewritten.

GREER, R. P. A study of nasion as a cephalometric landmark. (M. S. thesis—University of Tennessee.) Memphis, 1957. 40 p. Typewritten.

HARRIS, J. G. Some psychological differences between children with well-aligned incisor teeth and those with spaced, protrusive incisors as revealed by the "Blacky" projective test. (M. S. thesis—University of Tennessee.) Memphis, 1960. 68 p. Typewritten.

HORNE, G. H. The acidity of zinc phosphate cement. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 29 p. Typewritten.

LAMBERT, C. G. Hypnotherapy in the control of tongue thrusting occurring during perverted swallowing. (M. S. thesis—University of Tennessee.) Memphis, 1958. 55 p. Typewritten.

NATIONAL NAVAL MEDICAL CENTER. Medical-dental TV reference. Chicago, American Medical Association, Department of Medical Motion Pictures and Television, 1961. 136 p. $3.

PASSOS, GEORGE DA MOTA. Processos carióticos micóticos: técnicas de defesa. (Tese para concorrer à Cátedra de Clínica Odontológica—Universidade do Recife.) Recife, 1961. 187 p. Summary in English and German.

PFLUGER, W. M. A study of the stability of orthodontic treatment. (M. S. thesis—University of Tennessee.) Memphis, 1959. 81 p. Typewritten.

PRICHARD, B. W. The correlation of skeletal pattern and soft tissue conformation in excellent adult female faces as revealed in lateral cephalometric roentgenograms. (M. S. thesis—University of Tennessee.) Memphis, 1957. 56 p. Typewritten.

RAMMING, R. W. Changes in apical base relations coincident with treatment of Class II, division I (Angle) malocclusion. (M. S. thesis—University of Tennessee.) Memphis, 1959. 43 p. Typewritten.

RICHARDSON, WALTER. Simple and complex orthodontic appliances: their effect on the lactobacillus plate count. (M. S. thesis—University of Tennessee.) Memphis, 1957. 62 p. Typewritten.

ROWAN, T. W. Changes in denture and skeletal patterns occurring during and following serial extraction. (M. S. thesis—University of Tennessee.) Memphis, 1959. 63 p. Typewritten.

RUMBLE, J. C. Functional variations of the temporomandibular joint in Class I and Class II (Angle) malocclusions as revealed in roentgenograms that were taken utilizing the Sandusky temporomandibular joint roentgenographic technique. (M. S. thesis—University of Tennessee.) Memphis, 1959. 131 p. Typewritten.

SADLER, J. F. A survey of some commercial adhesives: their possible application in clinical orthodontics. (M. S. thesis—University of Tennessee.) Memphis, 1956. 40 p. Typewritten.

SAIN, J. A. Changes in the integumental profile concomitant with orthodontic treatment. (M. S. thesis—University of Tennessee.) Memphis, 1960. 49 p. Typewritten.

SCHUBERT, R. E. Dispersion of the apices of the roots of the upper and lower central incisors as revealed by lateral cephalometric roentgenographs. (M. S. thesis—University of Tennessee.) Memphis, 1957. 55 p. Typewritten.

SHOTTS, A. C. A study of the correlations of some vertical facial components in males possessing Class II, Division I malocclusions. (M. S. thesis—University of Tennessee.) Memphis, 1959. 51 p. Typewritten.

SIMS, F. W. The pressure exerted on the maxillary and mandibular central incisors by the perioral and lingual musculature in acceptable occlusion cases. (M. S. thesis—University of Tennessee.) Memphis, 1956. 45 p. Typewritten.

SMITH, J. H. An investigation of cementation of simulated orthodontic brackets to extracted human teeth with rapid curing epoxy resins. (M. S. thesis—University of Kansas City.) Kansas City, 1961. 27 p. Typewritten.

SMITH, J. S. Orthographic projection as an aid in the interpretation of basilar cephalometric roentgenograms. (M. S. thesis—University of Tennessee.) Memphis, 1960. 56 p. Typewritten.

SPRENG, MAX. Die künstliche Zahnreihe beim Zahnlosen; Aufbau, Funktion, Ästhetik, Patient, Laboratorium. Arbeitsmethoden der Basler prothetischen Schule. (Praktische Zahnmedizin No. 1.) Basel, Birkhäuser, 1960. 98 p.

STAAB, A. E. The relative form of the palate in Class I and Class II malocclusions. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 58 p. Typewritten.

STERN, G. A. The conformation of facial soft tissues as revealed in lateral cephalometric roentgenograms; its importance in facial esthetics. (M. S. thesis—University of Tennessee.) Memphis, 1958. 86 p. Typewritten.

ULMAN, H. R. The effect of rotated teeth on dental arch length. (M. S. thesis—University of Kansas City.) Kansas City, 1961. 32 p. Typewritten.

U. S. NAVAL DENTAL SCHOOL (Bethesda, Md.). Dental Department administration. Prepared under the supervision of Bureau of Medicine and Surgery. (NAVPERS 10790-A.) Washington, Bureau of Naval Personnel, 1960. 454 p.

WARREN, E. B. A study of the correlation of denture and skeletal widths. (M. S. thesis—University of Tennessee.) Memphis, 1959. 45 p. Typewritten.

WARREN, J. E. A critical evaluation of the method of analyzing cephalometric roentgenograms employed by the Department of Graduate Orthodontics of the University of Tennessee. (M. S. thesis—University of Tennessee.) Memphis, 1959. 63 p. Typewritten.

WOOLRIDGE, H. R. The relationship of marked mandibular arch asymmetry and the ability to perform certain unusual tongue movements. (M. S. thesis—University of Tennessee.) Memphis, 1956. 45 p. Typewritten.

ZIEGLER, J. T. The comparative merits of cementing orthodontic bands on nondehydrated and air-dried teeth: a clinical study. (M. S. thesis—University of Tennessee.) Memphis, 1958. 89 p. Typewritten.

PERIODICALS

DENTAL BULLETIN OF OSAKA UNIVERSITY, (Osaka)

MAINE DENTAL ASSOCIATION NEWSLETTER, (Portland, Maine)

LA PROTHESE DENTAIRE FRANÇAISE, (Paris)

TIPS, FOR DENTAL STUDENTS FROM THE CAVITRON CORPORATION, (Long Island City, N. Y.)

YOUR CHILD PATIENT, (Skokie, Ill.)

List of certified dental materials revised to July 1, 1961

COUNCIL ON DENTAL RESEARCH

Because there has been some confusion regarding certified dental materials, the Council on Dental Research presents this summary to clarify the operation of its certification plan.

The first fundamental item in this plan is the existence of official American Dental Association specifications for dental materials. These specifications are the outcome of research by the American Dental Association Research Division at the National Bureau of Standards correlated with the clinical experience of members of the Association.

As the second step in the operation of the plan, the manufacturers are invited to certify to the Council on Dental Research that their products comply with the specifications. It would be manifestly impossible for the Council (through the American Dental Association Research Division at the National Bureau of Standards) to test every lot of every certified material. For this reason, the Council has required that the manufacturer, on certifying a product, not only must guarantee that this product meets specification requirements but also must furnish evidence that he maintains a testing program adequate to insure continual compliance of the product.

On receipt of a certification for a new product with all required data, the Council procures a random sample through regular trade channels, usually by asking a dentist to act as its agent. This sample is tested for compliance with all specification requirements. Only when the certification is complete and in proper form and the sample has passed all specification tests does the Council accept the manufacturer's certification. The name of the product is then added to the list of certified dental materials.

This, however, is not the complete story. The continuation of any product on the list of certified dental materials is contingent on its maintenance at specification quality. Surveys of all products on the list are made at the Council's direction. These surveys are made on samples procured on the open market. Whenever a material fails to comply with the specification requirements, it is removed from the list and the manufacturer is notified that his certification of the product is no longer acceptable. Thus, although the Council cannot test the entire production of dental materials, its certification plan calls for continuous testing by the manufacturer and check tests by the Research Division so that a constantly high level of quality of the products on the list will be maintained. Revisions of the list appear in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION from time to time.

Lately, there have appeared through the mail some advertisements for amalgam alloys, mercuries, zinc phosphate cements and acrylic resins with statements that the manufacturer guarantees them to comply with the specifications of the American Dental Association. An examination of the list of certified dental materials shows that some of the materials that have been so advertised have not been certified by their manufacturers to

the Council on Dental Research. When a dentist sees a statement such as, "Every batch of this alloy is carefully tested before being released for shipment to be sure that it fully meets A.D.A. specifications," he should be certain to check the list of certified dental materials to see if the product appears there.

In the purchase of certified material for use in dental practice, this list should be considered as a quality guide. In addition, the package of material received should be checked for its exact name as given in the list and for a statement thereon guaranteeing compliance with the specification. The Council should be notified of any discrepancies.

The materials appearing on this list will produce satisfactory restorations only if used properly. In almost all instances the respective manufacturer's directions should be rigidly adhered to in using a specific material. In other words, the technic of using is as important as the material for the simple reason that an inferior technic will ruin or damage a superior material. Changes, made frequently in this list, are printed in the Reports of Councils and Bureaus section of THE JOURNAL.

CERTIFIED DENTAL AMALGAM ALLOYS
(A.D.A. SPECIFICATION NO. 1, FIRST REVISION)

Alloy	*Manufacturer or distributor*
Accurate Metalloy (filings)	The L. D. Caulk Co.
Ames Alloy Quick Setting	The W. V-B. Ames Co.
Argentum "A"; Fine Cut; Medium Cut	Hammond Dental Mfg. Co.
Aristaloy	Baker Dental Division Engelhard Industries, Inc.
Baring (improved fine cut)	Baring Smelting & Refining Co.
Brewster Medium	Brewster Laboratories
Certified Non-Zinc	Lee Smith Co.
Cresilver	Crescent Dental Mfg. Co.
Fellowship	Dental Protective Supply Co.
Filling Alloy (fine grain)	Abe Bass
Fleck's	Mizzy, Inc.
Garfield's	Garfield Smelting & Refining Co.
Gem Regular; Fine Cut	Certified Dental Supply Corp.
Gold Bond	Jefferson Dental Supply Co.
H & M Special	Hauser and Miller
Linc-Alloy	Lincoln Dental Supply Co.
Lustraloy Regular	Pfingst & Co.
Midvalloy	Midvale Dental Supply Co.
Minimax (filings) 178; 178 Non-Zinc; 178 Fine Cut; 183; White Gold & Platinum	The Minimax Co.
Modeloy (quick setting filings)	Crescent Dental Mfg. Co.
Mowrey 695 Fast; 695 Medium; 695 Fine Cut; 700 Non-Zinc; 700 Non-Zinc Fine Cut	W. E. Mowrey Co.
Mynol Improved	Mynol Chemical Co.
National Dental	Eskay Dental Products
New Deal	Miller Dental Co.

Oceanic Filling Alloy	Oceanic Chemical Co., Inc.
Odontographic "Improved" (filings)	Odontographic Mfg. Co.
Peerless	Herbert D. Damsky
Precision	Precision Bur Co.
Research Oralloy	Precious Metals Research Works, Inc.
Royal Super First Setting	Garhart Dental Specialty Co.
Safco 69	Safco Laboratories
70% Silver Filling Alloy	Pure-Lab Co. of America
Silver Crown (filings and pellets) Medium; Non-Zinc; Fine Cut; Fine Cut Non-Zinc	General Refineries, Inc.
Silverloy (filings); F.C. #20 for Proportioner	Crescent Dental Mfg. Co.
Silverman's Ex-cel	L. Silverman Dental Supplies
Speyer	Speyer Smelting & Refining Co.
S-C Medium (filings and pellets)	Stratford-Cookson Co.
Standard	Standard Dental Products Co.
Stratco	Edward P. Stratt
Tri-Alloy	Tri-Boro Dental Supply Co., Inc.
True Dentalloy (filings); Cut "A"; New; Zinc Free	The S. S. White Dental Mfg. Co.
Twentieth Century Regular; Fine Cut; Non-Zinc; (filings and pellets) Micro; Micro Non-Zinc	The L. D. Caulk Co.
Ultra Brand Regular 68%; Fast Setting 68%; Improved 68%; 72% Silver	H. Jelinek Dental Alloys
White Beauty; Fine Cut	Lang Dental Mfg. Co.
Yates Balanced	Yates Dental Mfg. Co.

CERTIFIED DENTAL INLAY CASTING INVESTMENTS
(A.D.A. SPECIFICATION NO. 2)

Investment	*Manufacturer or distributor*
All Purpose, Formula No. 35	The S. S. White Dental Mfg. Co.
Baker Cristobalite	Baker Dental Division, Engelhard Industries, Inc.
Beauty-Cast	Whip-Mix Corp., Inc.
Cristo-Vest	The Ransom & Randolph Co.
Kerr Cristobalite-Inlay	Kerr Mfg. Co.
Ransom & Randolph Gray	The Ransom & Randolph Co.
Steele's Super	The Ransom & Randolph Co.
S. S. White Formula 25	The S. S. White Dental Mfg. Co.

CERTIFIED DENTAL IMPRESSION COMPOUNDS
(A.D.A. SPECIFICATION NO. 3, FIRST REVISION)

Compound	*Type*	*Manufacturer or distributor*
Certified	I	Lee Smith Co.
Exact	I	The S. S. White Dental Mfg. Co.

Kerr Perfection; No. 2 Soft Green; Grey; White; Black	I	Kerr Mfg. Co.
Mizzy Low Heat	I	Mizzy, Inc.
S. S. White-Black-Tray	II	The S. S. White Dental Mfg. Co.

CERTIFIED DENTAL INLAY CASTING WAXES
(A.D.A. SPECIFICATION NO. 4, FIRST REVISION)

Wax	*Manufacturer or distributor*
Baker-Blue—Regular Medium	Baker Dental Division, Engelhard Industries, Inc.
Blue Inlay—Hard	The S. S. White Dental Mfg. Co.
Kerr-Blue—Hard	Kerr Mfg. Co.
Security	The Cleveland Dental Mfg. Co.
Taggart's Blue	Mizzy, Inc.

CERTIFIED DENTAL INLAY CASTING GOLD ALLOYS
(A.D.A. SPECIFICATION NO. 5)

TYPE I, SOFT
BRINELL NUMBER 40-75

Alloy	*Manufacturer or distributor*
Aderer-A-Soft	Julius Aderer, Inc.
Baker Inlay Soft	Baker Dental Division, Engelhard Industries, Inc.
Coe 1	Coe Laboratories, Inc.
Crown Inlay No. 2 Soft; K	General Refineries, Inc.
Deeone	Handy & Harman
GB Inlay No. 1 Soft	Goldsmith Bros. Dental Co.
Jelenko Special Inlay	J. F. Jelenko & Co., Inc.
Leff Light Inlay	Leff Dental Golds
Luft "A"	John Luft Prescription Alloys
Mowrey's S-1; S-M	W. E. Mowrey Co.
Ney-Oro A; AA	The J. M. Ney Co.
Noble No. 1	Noble Metals & Alloys Co.
Research A	Precious Metals Research Works, Inc.
Spyco Soft; Eleven	Spyco Smelting & Refining Co.
S. S. White No. 2; 900 Soft; 940 Very Soft	The S. S. White Dental Mfg. Co.
Stern S	I. Stern & Co., Inc.
Wildberg A-2	Wildberg Bros. Smelting & Refining Co.
Williams-Chilcast No. 1; Williams Inlay 3; Will-Cast 22; Harmony Line Soft	The Williams Gold Refining Co., Inc.

TYPE II, MEDIUM
BRINELL NUMBER 70-100

Alloy	*Manufacturer or distributor*
Aderer-B-Medium	Julius Aderer, Inc.
Aleco No. 1; No. 2	A. L. Engelhardt Co.
Baker Inlay Medium	Baker Dental Division, Engelhard Industries, Inc.
Coe 2	Coe Laboratories, Inc.
Crown Inlay No. 1 Hard; Knapp No. 2; T	General Refineries, Inc.
Deetwo	Handy & Harman
GB Inlay No. 2 Medium Hard	Goldsmith Bros. Dental Co.
Jelenko Modulay; Platincast; J-8	J. F. Jelenko & Co., Inc.
Leff Medium Soft	Leff Dental Golds
Luft "B"	John Luft Prescription Alloys
Mowrey's B-Inlay; S-2; No. 91; T	W. E. Mowrey Co.
Ney-Oro A-1; A-10	The J. M. Ney Co.
Noble No. 2	Noble Metals & Alloys Co.
Spyco Inlay; Medium; Tinker One	Spyco Smelting & Refining Co.
S. S. White No. 1; No. 5; No. 820	The S. S. White Dental Mfg. Co.
Stern 1	I. Stern & Co., Inc.
Wildberg "A"	Wildberg Bros. Smelting & Refining Co.
Wilkinson 8M	Wilkinson Co.
Williams-Chilcast M; 2M; Williams Pioneer; Special Inlay; One "Inlay"; Harmony Line Medium	The Williams Gold Refining Co., Inc.

TYPE III, HARD
BRINELL NUMBER 90-140

Alloy	*Manufacturer or distributor*
Aderer-C-Bridge; "Dressel"	Julius Aderer, Inc.
Baker Hard Inlay	Baker Dental Division, Engelhard Industries, Inc.
Coe 3	Coe Laboratories, Inc.
Crown No. 9; Knapp No. 3; Supreme Inlay; TT	General Refineries, Inc.
Deesix	Handy & Harman
Dent Gold No. 2	A. Szabo Company, Inc.
GB Inlay No. 3 Hard	Goldsmith Bros. Dental Co.
Jelenko Durocast; Firmilay; J-9	J. F. Jelenko & Co., Inc.
Leff C	Leff Dental Golds
Luft "C"	John Luft Prescription Alloys
Mowrey's S-3; Special; No. 120; TT	W. E. Mowrey Co.
Ney-Oro B; B-2	The J. M. Ney Co.
Noble No. 3	Noble Metals & Alloys Co.
Research No. 5; "Inlay"	Precious Metals Research Works, Inc.

Spyco No. One-H; Six; Tinker Two; Hard	Spyco Smelting & Refining Co.
S. S. White No. 8; No. 13; 860 Hard	The S. S. White Dental Mfg. Co.
Stern 2; 3337; H	I. Stern & Co., Inc.
Wildberg "C"; B	Wildberg Bros. Smelting & Refining Co.
Williams-Chilcast 2; 2H; Williams Klondiker; Special "Four"; Harmony Line Hard	The Williams Gold Refining Co., Inc.

CERTIFIED DENTAL MERCURIES
(A.D.A. SPECIFICATION NO. 6)

Mercury	*Manufacturer or distributor*
Argentum	Hammond Dental Mfg. Co.
Ballard's	Quicksilver Producers Association
Chemically Pure	The S. S. White Dental Mfg. Co.
Chemically Pure	Stratford-Cookson Co.
C.P. Mercury	Goldsmith Bros. Dental Co.
C.P. Mercury	H. Jelinek Dental Alloys
Crown	General Refineries, Inc.
Dental	Drug Laboratories, Inc.
Dental	National Zinc Co., Inc.
Dental, C.P.	Woodridge Chemical Corp.
Fellowship	Dental Protective Supply Co.
Garfield's	Garfield Smelting & Refining Co.
Garhart's Positively Pure	Garhart Dental Specialty Co.
Krause's Pure	Krause Gold Refineries
Merck Redistilled N.F.	Merck & Co., Inc.
Mercury C.P.	Metalsalts Corp.
Mercury C.P.	Wildberg Bros. Smelting & Refining Co.
Mercury N.F. IX Redistilled	Mallinckrodt Chemical Works
Mercury Triple Distilled C.P.	Laboratory Products Co.
Minimax	The Minimax Co.
Mission	Henry F. Bruce Co.
Mowrey Mercury	W. E. Mowrey Co.
Mynol	Mynol Chemical Co.
Ney	The J. M. Ney Co.
Odontographic	Odontographic Mfg. Co.
Research	Precious Metals Research Works, Inc.
Spectropure	Baker Dental Division, Engelhard Industries, Inc.
Spyco	Spyco Smelting & Refining Co.
Triple Distilled Mercury	Eastern Smelting & Refining Co.
Triple Distilled Mercury C.P.	Oceanic Chemical Co., Inc.
Twentieth Century	The L. D. Caulk Co.
Ultra Pure Mercury	Theta Corporation
Williams	The Williams Gold Refining Co., Inc.

CERTIFIED DENTAL WROUGHT GOLD WIRE ALLOYS
(A.D.A. SPECIFICATION NO. 7)

Alloy	*Manufacturer or distributor*
Aderer No. 20 Clasp	Julius Aderer, Inc.
Baker Q.A.	Baker Dental Division, Engelhard Industries, Inc.
Crown Hylastic	General Refineries, Inc.
Deepep-Hard	Handy & Harman
GB Regular High Fusing	Goldsmith Bros. Dental Co.
Jelenko No. 3 Wire; Super Wire	J. F. Jelenko & Co., Inc.
Ney-Oro Elastic No. 4	The J. M. Ney Co.
Spyco No. 2; No. 4	Spyco Smelting & Refining Co.
S. S. White No. 12; No. 61 Metalba	The S. S. White Dental Mfg. Co.
Stern No. 2657	I. Stern & Co., Inc.
Williams-Chilcast No. 6; Williams No. 1; No. 2; No. 3	The Williams Gold Refining Co., Inc.

CERTIFIED DENTAL ZINC PHOSPHATE CEMENTS
(A.D.A. SPECIFICATION NO. 8, FIRST REVISION)

Cement	*Manufacturer or distributor*
Ames Z-M	The W. V-B. Ames Co.
Bosworth's Zinc	Harry J. Bosworth Co.
Caulk Crown and Bridge; Tenacin	The L. D. Caulk Co.
Certicem	Lee Smith Co.
Fleck's Extraordinary	Mizzy, Inc.
Lang Crown Bridge and Inlay	Lang Dental Mfg. Co.
Merrick Zinc Cement	Merrick Laboratories
S-C	Stratford-Cookson Co.
Smith's	Lee Smith Co.
S. S. White Silver Improved; Zinc; Zinc Improved	The S. S. White Dental Mfg. Co.

CERTIFIED DENTAL SILICATE CEMENTS
(A.D.A. SPECIFICATION NO. 9, FIRST REVISION)

Cement	*Manufacturer or distributor*
Achatite	Vivadent Corporation
Ames Plastic Porcelain	The W. V-B. Ames Co.
Astralit	Premier Dental Products Co.
Baker Plastic Porcelain	Baker Dental Division, Engelhard Industries, Inc.
DeTrey's Synthetic Porcelain; Syntrex	The L. D. Caulk Co.
Durodent Enamel	Oskar Schaefer
Smith's Certified Enamel Improved	Lee Smith Co.
S. S. White Filling Porcelain Improved; New Filling Porcelain	The S. S. White Dental Mfg. Co.

CERTIFIED HYDROCOLLOIDAL IMPRESSION MATERIALS—AGAR TYPE
(A.D.A. SPECIFICATION NO. 11)

Material	*Manufacturer or distributor*
Deelastic	Kerr Mfg. Co.
Dentocoll	The L. D. Caulk Co.
Elastic Colloid	The S. S. White Dental Mfg. Co.
Kerr Hydro-Colloid	Kerr Mfg. Co.
Perfectocoll	Baker Dental Division Engelhard Industries, Inc.
Surgident	Surgident, Ltd.

CERTIFIED DENTURE BASE RESINS
(A.D.A. SPECIFICATION NO. 12, SECOND REVISION)

TYPE I, HEAT-CURING

Material	*Form*	*Manufacturer or distributor*
Acralite	Clear; pink; powder-liquid	Acralite Co., Inc.
Acralite RL	Pink; powder-liquid	Acralite Co., Inc.
Acri-Lux	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Acrylic A Pink	Pink; powder-liquid	Austenal Company, Division of Howe Sound Company
Acrylic A Mottled	Pink; powder-liquid	Austenal Company, Division of Howe Sound Company
Acrylic A Orange-Pink	Pink; powder-liquid	Austenal Company, Division of Howe Sound Company
BioLux "521"	Pink; powder-liquid	B. L. Dental Co., Inc.
Characterized Lucitone	Pink; powder-liquid	The L. D. Caulk Co.
Densene Muco-Tone Fibered	Pink; powder-liquid	Cosmos Dental Products, Inc.
Densene Muco-Tone Fiberless	Pink; powder-liquid	Cosmos Dental Products, Inc.
Densene 33 Varihued	Pink; powder-liquid	Cosmos Dental Products, Inc.
Denture Acrylic	Clear; pink; powder-liquid	The S. S. White Dental Mfg. Co.
Duolite 2	Pink; powder-liquid	Acralite Co., Inc.
Duraflow	Pink; powder-liquid	Product Research Lab., Inc.
Enciton	Pink; powder-liquid	The L. D. Caulk Co.
Hygienic	Pink; powder-liquid	The Hygienic Dental Mfg. Co.
Hy-Pro Lucitone Standard	Pink; powder-liquid	The L. D. Caulk Co.
Hy-Pro Lucitone Fibered	Pink; powder-liquid	The L. D. Caulk Co.
Improved Densene 33	Clear; pink; powder-liquid	Cosmos Dental Products, Inc.
Improved Densene TisHue	Pink; powder-liquid	Cosmos Dental Products, Inc.

Improved Justi-Tone T-3	Pink; powder-liquid	H. D. Justi & Son, Inc.
Jectron	Pink; precured blank	Toledo Dental Products Co.
Lang's	Pink; powder-liquid	Lang Dental Mfg. Co.
Lucitone	Clear; pink; powder-liquid	The L. D. Caulk Co.
Luxene 44	Pink; plastic cake	Luxene, Inc.
Miracryl	Pink; powder-liquid	The Motloid Co., Inc.
Palatex	Pink; powder-liquid	Rockland Dental Co., Inc.
Palatex Mottled	Pink; powder-liquid	
Perma Cryl	Pink; powder-liquid	Acri-Lux Dental Mfg. Co.
Permatone	Clear; pink; powder-liquid	Acralite Co., Inc.
Pour-A-Densene	Clear; pink; powder-liquid	Cosmos Dental Products, Inc.
Pour-A-Densene TisHue	Pink; powder-liquid	
Tilon	Pink; plastic cake	Ticonium Division Consolidated Metal Products Corp.
Vernonite-Chromavein	Pink; plastic cake Pink; powder-liquid	Vernon-Benshoff Co.
Vernonite	Clear; pink; plastic cake Pink; powder-liquid	
Vitacrilic	Pink; powder-liquid	Fricke Dental Mfg. Co.
Vita-Lite	Pink; powder-liquid	Vita-Lite Products Co.
Vitalon Even Tone	Pink; powder-liquid	Austenal Company, Division of Howe Sound Company
Vitalon Mottle Tone	Pink; powder-liquid	
Vitalon Tissue Tone	Pink; powder-liquid	

TYPE II, SELF-CURING

Material	*Form*	*Manufacturer or distributor*
Acralite 88 Tissue Tone	Pink; powder-liquid	Acralite Co., Inc.
Acralite 88 True Life	Pink; powder-liquid	
Densene 33	Pink; powder-liquid	Cosmos Dental Products, Inc.
Palatex 51	Pink; powder-liquid	Rockland Dental Co., Inc.

CERTIFIED SELF-CURING REPAIR RESINS
(A.D.A. SPECIFICATION NO. 13)

Material	*Form*	*Manufacturer or distributor*
Acralite 88	Pink; powder-liquid	Acralite Co., Inc.
Bindit	Pink; powder-liquid	Rockland Dental Co., Inc.
Dyna-Set	Pink; powder-liquid	Cosmos Dental Products, Inc.

CERTIFIED DENTAL CHROMIUM-COBALT CASTING ALLOYS
(A.D.A. SPECIFICATION NO. 14)

Material	*Manufacturer or distributor*
Durallium	Durallium Products Corp.
Rx Dental Alloy	Vita-Loy Processing & Products, Inc.
Ticonium No. 50	Ticonium Div., CMP Industries Inc.
Vitallium	Austenal Company, Division of Howe Sound Company

CERTIFIED ACRYLIC RESIN TEETH
(A.D.A. SPECIFICATION NO. 15)

TYPE I, ANTERIOR

Material	*Manufacturer or distributor*
Dura-Blend; Dura-Blend Characterized	Myerson Tooth Corp.
Justi S-R	H. D. Justi & Son, Inc.
Trubyte Biotone	Dentists' Supply Co.
Verident	Universal Dental Co.

TYPE II, POSTERIOR-ANATOMIC

Material	*Manufacturer or distributor*
Dura-Blend FLX; Synchronized (Dura-Blend)	Myerson Tooth Corp.
Justi S-R	H. D. Justi & Son, Inc.
Trubyte Biotone Pilkington Turner Trubyte Dentron 20°	Dentists' Supply Co.

TYPE III, POSTERIOR-NONANATOMIC

Material	*Manufacturer or distributor*
Justi S-R	H. D. Justi & Son, Inc.
Myerson and Sears (Dura-Blend) Shear Kusp (Dura-Blend)	Myerson Tooth Corp.
Trubyte Biotone Rational	Dentists' Supply Co.

Council approves American Dental Association Specification No. 16 for Impression Paste—Zinc Oxide-Eugenol Type

COUNCIL FOR DENTAL RESEARCH

The following specification was recently approved by the Council on Dental Research as the official specification of the American Dental Association for zinc oxide-eugenol impression material.

The specification was formulated through the Specifications Committee of the Dental Materials Group (International Association for Dental Research) and by one of its subcommittees.

The Council wishes to acknowledge, with thanks, the work of the subcommittee members, who are: W. S. Crowell (chairman), The S. S. White Dental Manufacturing Company, Philadelphia; Frank Freeman, Kerr Manufacturing Company, Detroit; E. J. Molnar, Coe Laboratories, Inc., Chicago; G. E. Myers, School of Dentistry, University of Michigan, Ann Arbor, Mich., and H. J. Caul (secretary), American Dental Association Research Division, National Bureau of Standards, Washington, D. C.

AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 16 FOR IMPRESSION PASTE—ZINC OXIDE-EUGENOL TYPE

(Approved April, 1961. Effective April 1, 1962)

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification is for dental impression paste, the reactive ingredients of which are zinc oxide and eugenol.

1.2 Types. The impression paste covered by this specification shall be of the following types as specified by the purchaser:

Type I Hard
Type II Soft

2. APPLICABLE SPECIFICATIONS

2.1 Specification. There are no other specifications applicable to this specification. (Copies of American Dental Association specifications may be obtained free upon application to the Council on Dental Research, American Dental Association, 222 E. Superior St., Chicago 11, or to the American Dental Association Research Division, National Bureau of Standards, Washington 25, D. C.)

3. REQUIREMENTS

3.1 Material. The unit package of paste shall consist of two collapsible tubes; one containing the zinc oxide paste, and the other containing the eugenol paste.

Table • Requirements for consistency of mix, initial and final setting time and penetration hardness

Type	Consistency		Initial setting		Final setting	Penetration hardness	
	Min.	Max.	Min.	Max.	Max.	Min.	Max.
	mm.	mm.	Minutes	Minutes	Minutes	mm.	mm.
I	30	50	3	6	10	—	0.5
II	20	45	3	6	15	0.8	1.5

3.1.1 Extrusion and mixing. Both pastes shall be of such consistency that they can be easily extruded from collapsible tubes. The pastes shall mix readily when spatulated on a slab in the usual dental manner.

3.1.2 Color. The zinc oxide paste and the eugenol paste shall be of contrasting colors.

3.1.3 Homogeneity. The zinc oxide paste and the eugenol paste shall be clean and homogeneous, that is, free of foreign material, granules and crystals.

3.2 Chemical properties.

3.2.1 Irritation. The paste shall contain no ingredients, other than eugenol, which are irritating to the oral tissues. The eugenol paste shall contain not more than 17 per cent eugenol by weight.

3.3 Physical properties.

3.3.1 The requirements for consistency of mix, initial and final setting time and penetration hardness shall be as listed in the table.

3.3.2 It shall be possible to separate the set material cleanly from a hardened gypsum cast.

4. SAMPLING, INSPECTION AND TESTING PROCEDURES

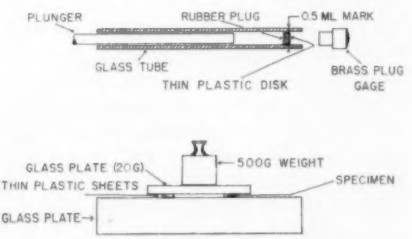
4.1 Sampling. Two unit packages (3.1) shall be procured at retail by a member of the American Dental Association. This sample shall be forwarded in the original unopened package or packages to the American Dental Association Research Division, National Bureau of Standards, Washington 25, D. C.

4.2 Inspection. Visual inspection shall be used in determining compliance with requirements outlined in 3.1, 3.1.1, 3.1.2, 3.1.3 and 3.3.2.

4.3 Testing procedures.

4.3.1 Preparation of test specimens. The preparation of test specimens shall be conducted at a temperature of 23.0 ± 2.0°C. (73.4 ± 3.6°F.) and at a relative humidity of 50 ± 5 per cent. The two pastes shall be measured by weight in the proportions specified by the manufacturer. The mixing technic shall be that described by the manufacturer.

4.3.2 Consistency. One type of apparatus for measuring consistency is shown in the illustration. This apparatus consists of a glass tube (inside diameter approximately 10 mm. [0.39 in.]) which will deliver a definite volume (0.5 ml.) of mixed paste, two flat glass plates, a 500 Gm. weight and two thin plastic sheets. The combined weight of the top plate and the weight shall be 520 ± 2 Gm. After mixing, 0.5 ml. of the paste shall be placed in the measuring device and deposited on one thin plastic sheet on a glass plate.



Apparatus for consistency tests

One and one-half minutes after starting the mix, a second cellophane sheet, a second glass plate and the 500 Gm. weight shall be carefully placed on the soft paste. Ten minutes after starting the mix the weight shall be removed and the major and minor diameters of the slumped mass of paste shall be measured to the nearest millimeter. The average value for three disks shall be reported to the nearest millimeter.

4.3.3 Setting characteristics. A cup 25 mm. (1 in.) in diameter and 3 mm. (.125 in.) deep shall be overfilled with impression paste prepared as described in 4.3.1 and the surface struck off level with a spatula. All times shall be measured from the time mixing is commenced.

4.3.3.1 Initial setting. A steel rod 2.4 mm. (.094 in.) in diameter with hemispherical ends and weighing 10 Gm. shall be applied to the surface of the material at 30 second intervals. The end of the rod shall be wiped clean after each application.

The time of initial setting shall be the number of minutes elapsed from the starting of the mix to the time at which the material ceases to string when the rod is withdrawn. The time of initial setting shall be recorded to the nearest half minute. The value for time of initial setting shall be reported as the average of three determinations and shall be rounded off to the nearest half minute.

4.3.3.2 Final setting. The specimen used for measuring the time of initial setting shall be used for measuring the time of final setting. The cup shall be placed on the platen of a Krebs penetrometer (or similar instrument of equal accuracy) which shall be equipped with a cylindrical indenter 1.59 ± 0.013 mm. (0.0625 ± 0.0005 in.) in diameter, loaded so that the weight of the indenter and load shall be 50 Gm. The indenter shall be applied to the surface of the specimen for ten seconds at 30 second intervals and the penetration measured. The time of final setting shall be the number of minutes elapsed from the starting of the mix to the time when the penetration falls below 0.2 mm. The value for time of final setting shall be reported as the average of three determinations and shall be rounded off to the nearest half minute.

4.3.3.3 Penetration hardness. The specimen used for measuring final set shall be used for measuring penetration hardness. The cup shall be placed on the platen of a Krebs penetrometer equipped with the standard penetrometer needle described in ASTM 1955, Part 3, Page 1643, Specification Number D5-52, and so loaded that the weight of the needle and load shall total 100 Gm. Thirty minutes after mixing is commenced, the loaded needle shall be applied to the surface of the specimen for ten seconds and the penetration recorded to the nearest 0.1 mm. The value for penetration shall be reported as the average of three determinations and shall be rounded off to the nearest 0.1 mm.

4.3.4 Cast surface. A specimen shall be prepared as described in 4.3.3. The specimen shall be boxed with a strip of wax so that the wax extends 1 inch above the surface of the material. Five minutes after final setting, a mix of gypsum (dental stone), prepared according to the manufacturer's directions, shall be poured into the boxed specimen and vibrated to eliminate air bubbles at the interface. Two hours later, the specimen shall be placed in water at 60°C. (140°F.) for 15 minutes. The cast shall then be separated from the impression and the surfaces in contact shall be examined visually for adherence. There shall be no evidence of adherence of the impression to the cast or of the cast to the impression.

4.3.5 Method of determining eugenol. The American Dental Association may accept a statement signed by a responsible officer of the manufacturer certifying that his company's product contains less than 17 per cent of eugenol by weight, in lieu of chemical analysis.

5. PREPARATION FOR DELIVERY

5.1 Packaging. The pastes shall be packed in collapsible tubes made of materials which will not react with or contaminate the pastes.

5.2 Instructions for use. Instructions for use shall include preferred proportions of the two components by weight and by volume and instructions for mixing them. These instructions shall accompany each unit package.

5.3 Marking.

5.3.1 Lot numbers. Each tube and/or unit package of material shall be marked with a serial number or a combination of letters and numbers which shall refer to the manufacturer's records for that particular lot or batch.

5.3.2 Date of manufacture. The date of manufacture (year and month) shall be given on the unit package either as a separate item or as part of the lot number (5.3.1).

5.3.3 Net weight. The minimum net weight shall be given in legible type on the individual tubes or the unit package.

Survey of public attitudes regarding dentures

VI. Frequency of visits to the dentist

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

As a by-product of the principal subject of this survey, information was obtained on the length of time since last visit to a dentist and intended future frequency of dental visits, from the 6,861 adults who returned questionnaires.

As shown in Table 39, 59.4 per cent of the respondents indicated they had been to a dentist "one year or less" ago. The Bureau has previously estimated that 47 per cent of the entire population, and 47 per cent of the population 20 and older, saw the dentist during 1958. Other sources have indicated that if this figure is in error it is too high. In this survey, some respondents undoubtedly did not remember accurately the length of time since their last visit to a dentist, and gave themselves the benefit of the doubt. Such a reply as "one year," for example, is an approximation and probably included many whose last visit to a dentist was made 15 or 18 months previously.

The bias in the results of this survey with regard to frequency of visits to the dentist does not invalidate comparisons according to such variables as age, sex, income and education.

This survey bears out the well established tendency for women to see their dentist more frequently than do men. For each of the periods of time under one year listed in Table 39, the percentage of women seeing the dentist is greater than the percentage of men. For each period of time greater than one year, the per-

Table 39 • Percentage distribution of respondents according to length of time since last visit to a dentist, by sex

Length of time	Male	Female	Both sexes
1 week or less	3.3	5.2	4.3
Over 1 week to 1 month	7.7	9.6	8.7
Over 1 month to 2 months	6.1	7.4	6.7
Over 2 months to 3 months	4.0	5.3	4.7
Over 3 months to 4 months	3.3	3.4	3.4
Over 4 months to 5 months	2.2	3.3	2.8
Over 5 months to 6 months	8.8	9.3	9.1
Over 6 months to 10 months	6.1	6.4	6.3
Over 10 months to 1 year	13.3	13.6	13.4
Over 1 year to 2 years	15.4	12.6	13.9
Over 2 years to 3 years	6.2	5.4	5.8
Over 3 years to 4 years	3.4	3.0	3.2
Over 4 years to 5 years	3.6	3.1	3.3
Over 5 years to 6 years	2.4	1.7	2.0
Over 6 years to 7 years	1.5	.9	1.2
Over 7 years to 8 years	1.8	1.1	1.4
Over 8 years to 10 years	4.3	3.0	3.6
Over 10 years to 15 years	3.2	2.9	3.1
Over 15 years	3.4	2.8	3.1
Total	100.0	100.0	100.0

Table 40 • Median length of time since last visit to a dentist, by age

Age	Median length of time
20–29	Over 6 months to 10 months
30–39	Over 6 months to 10 months
40–49	Over 10 months to 1 year
50–59	Over 10 months to 1 year
60–	Over 1 year to 2 years
No answer	Over 10 months to 1 year
All respondents	Over 10 months to 1 year

Table 41 • Median length of time since last visit to a dentist, by educational level

Educational level	Median length of time
No formal schooling	Over 2 years to 3 years
Some or all of elementary school	Over 1 year to 2 years
Some or all of high school	Over 10 months to 1 year
Some or all of college	Over 5 months to 6 months
All respondents	Over 10 months to 1 year

Table 42 • Median length of time since last visit to a dentist, by family income

Family income	Median length of time
Under $1,000	Over 2 years to 3 years
$1,000–$1,999	Over 1 year to 2 years
$2,000–$2,999	Over 1 year to 2 years
$3,000–$3,999	Over 10 months to 1 year
$4,000–$4,999	Over 10 months to 1 year
$5,000–$5,999	Over 10 months to 1 year
$6,000–$6,999	Over 6 months to 10 months
$7,000–$9,999	Over 6 months to 10 months
$10,000 and over	Over 5 months to 6 months
All respondents	Over 10 months to 1 year

Table 43 • Median length of time since last visit to a dentist, by occupational group

Occupational group	Median length of time
Professional, technical and kindred workers	Over 5 to 6 months
Farmers and farm managers	Over 10 months to 1 year
Managers, officials and proprietors (except farm)	Over 5 to 6 months
Clerical and kindred workers	Over 6 months to 10 months
Sales workers	Over 6 months to 10 months
Craftsmen, foremen and kindred workers	Over 10 months to 1 year
Operative and kindred workers	Over 10 months to 1 year
Service workers (including private household)	Over 1 year to 2 years
Farm laborers and foremen	Over 1 year to 2 years
Laborers, except farm and mine	Over 1 year to 2 years
Retired, students, disabled, unemployed, Armed Forces	Over 1 year to 2 years
All respondents	Over 10 months to 1 year

Table 44 • Percentage distribution of respondents according to reply made to the question "About how often do you intend to go to a dentist in the future?", by sex

Intended frequency of visit	Male	Female	Both sexes
Every six months	18.1	26.3	22.5
Every year	17.5	18.1	17.8
Every 2 years	2.4	1.5	1.9
Every 3 or more years	.7	.5	.6
As need arises	55.0	47.9	51.2
Never	4.1	3.4	3.7
No answer	2.2	2.3	2.3
Total	100.0	100.0	100.0

centage of men is greater than the percentage of women. The percentage having seen the dentist "six months or less" ago was 35.4 per cent for men and 43.5 per cent for women. For the period of one year the figures were 54.8 per cent of the men and 63.5 per cent of the women.

Median length of time since last visit to a dentist varied with age of respondent from "over six months to 10 months" for persons 20 to 29 years old to "over one year to two years" for persons 60 and older (Table 40). For all respondents combined, the median was "over 10 months to one year."

The median period since last dental visit was "over 10 months to one year" in each of the seven regions except New England, where it was "over 6 months to 10 months." The percentage of respondents indicating they had been to a dentist "one year or less" ago ranged from 53.7 per cent in the Southwest to 62.3 per cent in New England.

Length of time since last visit to a dentist varied sharply with educational level and family income of the respondent (Tables 41 and 42). The median for those in the top education and income brackets was "over five months to six months." At the other extreme of these two variables the median was "over two years to three years." The variation by occupational group was in the expected direction, although not so pronounced as for educational level and income (Table 43).

"About how often do you intend to go to a dentist in the future?" To this question the respondent was asked to check one of the six alternative replies shown in Table 44. Less than one fourth (22.5 per cent) intended to go to the dentist as often as every six months. Of those who intended to go to the dentist at regular intervals, very few intended to go less frequently than once a year. More than half (51.2 per cent) did not indicate a definite period of time but checked "as need arises." One of every 27 respondents checked "never."

Only 18.1 per cent of the men, compared to 26.3 per cent of the women, intended to see the dentist with the usually recommended frequency—every six months (Table 44). About 28 per cent

Table 45 • Percentage distribution of respondents according to replies made to the question "About how often do you intend to go to a dentist in the future?", by age

Intended frequency of visit	Age				
	20–29	30–39	40–49	50–59	60–
Every six months	27.1	28.8	24.2	21.6	11.2
Every year	26.7	23.8	19.9	14.0	7.3
Every 2 years	2.6	2.6	1.8	1.5	1.0
Every 3 or more years	.5	.7	.5	1.0	.4
As need arises	41.7	42.3	49.6	55.1	65.5
Never	1.0	1.2	2.3	3.6	9.6
No answer	.4	.6	1.7	3.2	5.0
Total	100.0	100.0	100.0	100.0	100.0

Table 46 • Percentage distribution of respondents according to reply made to the question "About how often do you intend to go to a dentist in the future?", by educational level

Intended frequency of visit	Educational level			
	No formal schooling	Some or all of elementary school	Some or all of high school	Some or all of college
Every six months	5.4	8.3	23.0	37.5
Every year	13.5	9.1	19.1	24.2
Every 2 years	2.7	1.7	1.9	1.9
Every 3 or more years	5.4	.7	.6	.6
As need arises	54.1	68.2	51.0	33.0
Never	10.8	7.2	2.7	1.8
No answer	8.1	4.8	1.7	1.0
Total	100.0	100.0	100.0	100.0

Table 47 • Percentage distribution of respondents according to reply made to the question "About how often do you intend to go to a dentist in the future?", by family income

Intended frequency of visit	Family income								
	Under $1,000	$1,000-$1,999	$2,000-$2,999	$3,000-$3,999	$4,000-$4,999	$5,000-$5,999	$6,000-$6,999	$7,000-$9,999	$10,000 and over
Every six months	8.6	8.9	10.9	18.4	17.5	22.7	28.2	30.8	43.4
Every year	7.9	7.4	10.6	15.3	20.3	20.0	22.6	21.9	19.8
Every 2 years	1.5	.8	1.2	1.0	2.8	1.9	1.9	2.6	1.6
Every 3 years or more	.7	1.0	.3	.4	.9	.6	1.2	.5	.3
As need arises	67.6	66.5	67.8	57.3	53.0	51.8	42.5	40.1	32.9
Never	11.5	9.5	5.9	5.1	3.7	1.3	2.1	2.2	1.2
No answer	2.2	5.9	3.3	2.5	1.8	1.7	1.5	1.9	.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

of those under 40 years of age intended to see the dentist every six months, compared to only 11.2 per cent of people 60 and older (Table 45). "As need arises" was checked by 41.7 per cent of the respondents in their 20's and 65.5 per cent of those 60 and older. "Never" was the reply of 1.0 per cent in the youngest age bracket compared to 9.6 per cent in the oldest.

Intended frequency of visits to the dentist varied greatly according to both educational level and family income (Tables 46 and 47). "Every six months" was checked by only 5.4 per cent of those with no formal schooling compared to 37.5 per cent of those who had gone to college, and by 8.6 per cent of people with family income of less than $1,000 compared to 43.4 per cent in the "$10,000 and over" income category. The percentage who indicated they would never go to a dentist in the future dropped from about 11 per cent in the lowest education and income categories to less than 2 per cent in the highest.

Among the various occupational groups, the percentage intending to see the dentist every six months varied from 37.4 per cent of "professional, technical and kindred workers" to 8.1 per cent among "farm laborers and foremen." These two groups also were at the extremes in percentage checking "as need arises," with 33.3 per cent and 72.6 per cent respectively.

The final chapter in this series will be a summary of the results of the survey.

Survey of hospital dental departments
V. Facilities, planned expansions and dental research activities

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

To have a well rounded picture of hospital dental departments, information was requested on dental clinic facilities. Respondents were asked whether the hospital had a dental clinic, amount of floor space allocated to the clinic, weekly hours of clinic operation and number of dental x-ray machines.

It was intended that these data pertain to out-patient dental clinics. A sampling of yes responses to the question "Does the hospital have a dental clinic?" was compared with reports in the 1960 "Guide Issue" of *Hospitals, Journal of the American Hospital Association,* on whether the hospital had an out-patient department.

For a substantial number of responding hospitals that reported having a dental clinic, no out-patient department was reported in the "Guide Issue." In order of frequency with which this difference occurred, psychiatric and tuberculosis hospitals were first, followed by hospital departments of an institution. The difference also occasionally occurred in general and allied special hospitals.

A dental clinic in a hospital would, ordinarily, be within the out-patient department. From the sampling of responses as indicated above it appears that the term "dental clinic" was not uniformly interpreted by the respondents. Apparently, some respondents answered the question in terms of dental facilities available to and used by patients hospitalized for other conditions; for example, patients in psychiatric and tuberculosis hospitals. Also, it seems possible that some respondents interpreted dental clinic to mean clinical demonstrations.

Because of the noncomparability in interpretation of the term "dental clinic," data on these facilities are not presented. To do so could lead to invalid conclusions and have little meaning with reference to out-patient dental clinics. Data are summarized, however, for other dental facilities in the hospitals.

The number of dental chairs ranged from zero to 82 in the 969 hospitals for which this information was reported (Table 22). Approximately one tenth of the group did not have dental chairs and 27.2 per cent had one chair. In 37.4 per cent of these hospitals there were 2 to 4 chairs and in 15.9 per cent there were 5 to 9 chairs. The mean number of chairs varied substantially by hospital size and ownership or control. The mean for all responding hospitals was 3.9. Hospitals with less than 50 beds had a mean of 2.2 chairs whereas hospitals with 500 or more beds had a mean of 6.1 chairs. In federal hospitals the mean number of chairs was

Table 22 • Percentage distribution of hospitals according to number of dental chairs in hospital, by ownership or control

Number of chairs	Ownership or control				All hospitals
	Governmental, nonfederal	Governmental, federal	Voluntary (nonprofit)	Proprietary	
None	5.1	0.4	21.2	20.8	9.3
1	31.1	4.6	42.6	37.5	27.2
2–4	47.2	34.5	29.2	33.3	37.4
5–9	13.7	32.2	4.5	4.2	15.9
10–19	2.6	25.1	1.9	4.2	9.0
20 and over	3	3.2	.6	—	1.2
Total	100.0	100.0	100.0	100.0	100.0

Table 23 • Percentage distribution of hospitals according to number of dental units in hospital, by ownership or control

Number of units	Ownership or control				All hospitals
	Governmental, nonfederal	Governmental, federal	Voluntary (nonprofit)	Proprietary	
None	6.2	0.4	26.8	19.0	11.2
1	36.6	5.3	43.4	33.3	29.3
2–4	44.2	37.1	23.8	38.1	35.5
5–9	10.9	34.6	4.0	4.8	15.7
10 and over	2.1	22.6	2.0	4.8	8.3
Total	100.0	100.0	100.0	100.0	100.0

Table 24 • Per cent of hospitals according to type of planned expansion, by type of hospital

Type of planned expansion	Type of hospital			All hospitals
	General	Psychiatric	Other	
Purchase new equipment	13.9	27.7	16.6	16.8
Expand physical facilities	13.5	20.8	5.2	13.1
Acquire new dental clinic	6.7	8.7	4.1	6.6
Increase personnel	2.8	9.8	2.6	4.0
Increase space	3.0	2.3	2.1	2.7
Remodel clinic	2.0	2.3	1.6	2.0
Move to new location	1.6	1.2	1.0	1.4
Expand dental services	1.3	1.2	1.0	1.2
Increase training program	.5	.6	.0	.4
No description	6.9	6.4	6.2	6.7
Not elsewhere classified	.5	.6	.5	.5
Per cent planning any type of expansion	37.5	55.5	29.0	38.9

7.6 as compared to 1.9 in both voluntary and proprietary hospitals and 2.8 in nonfederal governmental hospitals.

Dental units in the 943 hospitals for which information was reported ranged from zero to 78 in number. In 11.2 per cent of the hospitals there were no units and in 29.3 per cent there was one unit (Table 23). About 35 per cent of the hospitals had 2 to 4 units. The mean

number of units varied by hospital size and ownership or control. In hospitals with less than 50 beds the mean number of units was 2.1 whereas in hospitals of 500 or more beds the mean was 5.3 units. Federal hospitals had the highest mean of 6.9 units and voluntary hospitals the lowest with 1.6 units.

Plans for expansion of the dental department were reported for almost 40 per cent of the hospitals participating in the survey. Proportionately, there was a greater number of expansion plans for dental departments in psychiatric hospitals than in any other type of hospital (Table 24). Among the reported plans, purchase of new equipment was mentioned most frequently, followed by expansion of existing physical facilities and construction of a new dental clinic. Of the hospitals which intended to purchase new equipment, purchase of dental unit(s) was reported for 31 per cent, purchase of dental chair(s) for 24 per cent and purchase of high speed equipment was reported for 20 per cent. For a number of hospitals, respondents stated that all new equipment would be purchased for contemplated expansion.

Of the hospitals for which there were plans for expansion of existing physical facilities, addition of an operatory and construction of a new dental laboratory were both mentioned by slightly more than one third of the group. Less frequently mentioned were construction of new office, addition of oral surgery room and recovery room.

With the exception of hospitals with less than 50 beds, the proportion of hospitals for which there were reported expansion plans increased as size of hospital increased. Approximately one half of the hospitals with 500 or more beds had expansion plans as opposed to 26 per cent of the hospitals with 50 to 99 beds.

For 45 per cent of the 391 hospitals for which there were plans for expanding the dental department expansion was scheduled for 1960. Expansion of the dental departments in 32 per cent of the hospitals was planned for 1961-1965. No

Table 25 • Number of dental research projects conducted in 161 hospitals

Classification	No. of projects
Disease entities or tissues	87
Periodontal disease	16
Oral medicine	14
Bone	12
Pulp studies	6
Caries	5
Saliva	5
Tumors	5
Congenital abnormalities	4
Gingiva	4
Periodontal membrane	4
Enamel	3
Temporomandibular joint	3
Malocclusion	2
Calcification	1
Dentin	1
Tooth substance	1
Transplanting teeth	1
Basic Science	31
Pathology	7
Epidemiology	5
Growth and development	4
Histology	3
Microbiology	3
Physiology	2
Psychology	2
Anthropology	1
Biochemistry	1
Hematology	1
Histochemistry	1
Pharmacology	1
Applied or Clinical Science	159
Oral surgery	32
Anesthetics	17
Drug allergy	16
Prosthodontics	15
Oral diagnosis	13
Antibiotics	8
Dental materials	7
Fluoride studies	7
Hygiene	7
Endodontology	5
Equipment	5
Nutrition	4
Ultrasonics	4
Public health	4
Orthodontics	3
Radiology	3
Clinical management of patients	3
Radioisotopes	2
Statistical studies	2
Drugs (local application)	1
Geriatrics	1
Total	277

definite time period was reported for the balance of the hospitals.

RESEARCH

Respondents were asked whether any dental research programs were being conducted at the hospital and, if so, to describe the programs. Dental research programs were reported under way in 187 of the participating hospitals. Sufficient description to classify the projects was given for the programs in 161 hospitals. The research programs were grouped into three broad categories: disease entities or tissues, basic sciences and clinical or applied sciences. Table 25 shows the number of research projects in each of these three categories.

The reported research programs were conducted predominantly in general hospitals; second in importance were psychiatric hospitals. Eighty-seven per cent of the dental research programs connected with basic sciences were in general hospitals and 7 per cent in psychiatric hospitals. Of the programs in applied or clinical science, 85 per cent were conducted in general hospitals and 8 per cent in psychiatric hospitals. Of the projects pertaining to disease entities or tissue, 75 per cent were conducted in general and 12 per cent in psychiatric hospitals.

As would be expected, more dental research projects were in large than in small hospitals. By hospital ownership or control, there were more research programs in federal hospitals than in hospitals under other auspices.

A majority of respondents, 64 per cent, were of the opinion that the dental department in their hospital was functioning satisfactorily. Comments about the functioning of the dental departments were made by 377 of the respondents. Among the suggestions for improvement of the department the most frequent comment was the need for additional personnel—dentists, hygienists, assistants and technicians. Comments about physical facilities of the dental departments were made next most frequently—need for better lay-out, better laboratory facilities, more space and need for out-patient facilities. Less frequently mentioned was the need to inaugurate or expand the internship, residency, research and teaching programs; the need to broaden the dental service, and to improve the organization of the dental department. Several respondents stated that they were satisfied with the dental department and that no change was needed.

The next and final chapter of this survey of hospital dental departments will be a summary.

book reviews

THE NATIONAL FORMULARY—ELEVENTH EDITION

Committee on National Formulary, American Pharmaceutical Association. 560 pages. Index. $9. Washington, D. C., American Pharmaceutical Association, 1960.

The National Formulary contains official specifications for drugs used in medicine and dentistry, and descriptions of the reagents and methods employed to determine whether listed drugs meet the specifications. It is completely revised every five years, and interim supplements are sent free of charge to purchasers of the *Formulary*.

From the dental point of view, the eleventh edition is remarkable in that it contains descriptions of many local anesthetics and two vasoconstrictors, all useful in dentistry, for which official standards have not hitherto existed.

The book is much thinner than the tenth edition, but the page size is the same. This decrease in over-all size (and weight) has been achieved by the use of thinner paper and a new two-column format. Actually the eleventh edition lists 43 more drugs than the tenth, and the descriptive content has not been curtailed. The net result is a more convenient book to use. *Donald A. Wallace*

SURGICAL AND MAXILLOFACIAL PROSTHESIS

By Oscar Edward Beder. 90 pages with 26 illustrations. $4. Seattle, University of Washington Press, 1959.

Surgical and Maxillofacial Prosthesis fills the need in the publications of today. If there were more books of this type available to the medical and dental profession and the professional schools, a better understanding of their specialties would result. The fairly recent upsurge in group procedures in medical clinics makes the book an essential in their libraries.

The indications and procedures for reconstructive surgery are concise and covered very well. The indications for prosthesis and their construction are well described and adequate for the postgraduate student but not for the undergraduate. The oral surgeon, plastic surgeon and oncologist can get a better understanding of the problem of construction and management of preoperative and postoperative prosthesis after reading this book.

This reviewer found the chapter on functional speech considerations in maxillofacial prosthesis most interesting and enlightening. The book is well written and an excellent text to be used by the dental and medical profession. *A. G. Anderson*

THE MERCK INDEX OF CHEMICALS AND DRUGS

Edited by Paul G. Stecher, M. J. Finkel, O. H. Siegmund and B. M. Szafranski. Seventh edition. 1,652 pages. $12. Rahway, N. J., Merck & Co., 1960.

The Merck Index is a textbook-size encyclopedia of chemicals and drugs. It has long been an essential reference book for chemists, pharmacists and pharmacologists, and for research workers in all of the health professions. According to the publisher, the book is sold without profit.

The seventh edition is about 50 per cent larger than the sixth, and contains descriptions of 10,000 items, whereas 8,000 were listed in the sixth edition. In the sixth edition, subsidiary names for chemicals and drugs were included in the main part of the book, whereas in the seventh edition all such names appear in a separate 270-page cross-index. The appendix on radioisotopes has been expanded.

There are several entirely new features in

the seventh edition. Chromatographic adsorbents and ion exchange materials are listed in a new appendix. There is a new food-calorie table, and a table of Latin abbreviations useful in the writing or interpretation of prescriptions. Nielsen and mouth-to-mouth methods of artificial respiration are described in the appendix on first aid.

The physical qualities of the seventh edition meet the high standard set by earlier editions, and it is competently edited. It can be recommended wholeheartedly to the readers for whom it is intended. *Donald A. Wallace*

NUTRITION IN CLINICAL DENTISTRY

By Abraham E. Nizel. 467 pages with appendixes. Index. $10. Philadelphia, W. B. Saunders Co., 1960.

This book is far more comprehensive in its coverage than the title implies. The greater share of the content is a discussion of basic concepts of physiology, physiologic chemistry and chemistry as they relate to the oral tissues and to nutrients, as well as a considerable compilation and review of pertinent research regarding their interrelationships. Specific outlines of advice for patients of differing dental conditions are given in Section 2. The author is to be commended for his consistent emphasis that diet suggestions and guides including lists of foods and beverages should be given in specific and not general terms.

The use of many subheadings in black type delineates the subject matter and serves to guide the reader to the phases he wants to explore. Because this comprehensive text and source book presumes a background in chemistry and physiology, it is well suited to the dental student and for the practicing dentist who wishes refresher and current material, but it probably is too technical for the dental hygienist.

For Section 1, "Basic Nutrition," Dr. Sanford Miller has supplied two chapters. For Section 2, "Applied Nutrition," Miss Isabel Patterson prepared two chapters on interpreting and applying nutrition knowledge. These latter chapters are excellent, particularly for any health worker whose nutrition background might be sketchy.

Most of the statements in the text are well within accepted knowledge, but occasionally some are presented with implications which may be questioned. For example, the reviewer is not aware that the beneficial effectiveness of foods as vehicles for fluoridation has been tested with regard to caries reduction in man. Nonetheless, the dentist who wishes to give his patients a total dental health service rather than one limited to local mechanical technics will find this book an effective guide to the roles of diet and nutrition.

Dorothea F. Radusch

PHARMACOPEIA OF THE UNITED STATES (USP XVI)

Prepared by the Committee of Revision. Sixteenth revision. 1,192 pages. Index. $10. Easton, Pa., Mack Publishing Co., 1960.

The U.S.P. is revised at five year intervals, and interim supplements are sent to purchasers of the book without charge. Its specifications for drugs are recognized by law as official. It is customary to list only those drugs in the U.S.P. which are of established value.

Nearly 300 items have been added in the sixteenth revision and 150 which were included in the fifteenth revision have been dropped. Among the additions, lidocaine, meprobamate, nystatin, penicillin V, promethazine HCl and propoxyphene HCl are of particular interest. The omissions include eucalyptol and Peruvian balsam.

Dentistry is not given much recognition in this revision of the U.S.P. Several drugs which are useful and widely used in dentistry are not described, and dental aspects are not taken into consideration adequately in the monographs on procaine and lidocaine. These latter drugs probably are used at least as much by dentists as by physicians. On the positive side, the monograph on sodium fluoride has been improved.

The sixteenth revision is well edited, typographically improved over previous editions, and the paper and binding are very good. It is a uniquely valuable reference text.

Donald A. Wallace

BOOKS RECEIVED BUT NOT REVIEWED

RADIOLOGICAL RECORDS • By Sister Christina Spirko, D.S.J. 304 pages with illustrations. $8.50. Charles C Thomas, 301-327 E. Lawrence Ave., Springfield, Ill., 1960.

AGING IN TODAY'S SOCIETY • Edited by Clark Tibbitts and Wilma Donahue. 418 pages. $6. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, 1960.

deaths

BUREAU OF MEMBERSHIP RECORDS

The following deaths occurred during 1960:

Bishop, Richard F., Torrance, Calif.; University of Southern California School of Dentistry, 1927; died October 4; age 54.

Blatner, LeRoy S., Albany, N. Y.; University of Pennsylvania School of Dentistry, 1901; died November 22; age 80.

Blinn, Simeon, Flint, Mich.; Columbia University School of Dental and Oral Surgery, 1939; died October 8; age 44.

Blurock, Edward W., Los Angeles; University of Southern California School of Dentistry, 1917; died October 11; age 65.

Bollinger, Edward, Worcester, Mass.; died October 28; age 73.

Bolt, Henry B., Corpus Christi, Texas; Washington University School of Dentistry, 1907; died November 29.

Bonvini, Robert C., Southport, Conn.; Baltimore College of Dental Surgery, University of Maryland, 1946; died November 9; age 37.

Bradshaw, Wayland C., Ogden, Iowa; Northwestern University Dental School, 1899; died December 2; age 85.

Brody, Rosamond G., Jaffrey, N. H.; College of Dental and Oral Surgery, 1905; died July 14; age 75.

Bunting, Thomas W., Camden, N. J.; Medico-Chirurgical College of Philadelphia, 1910; died December 13; age 78.

Burbank, Paul, Hampton, Va.; Medical College of Virginia School of Dentistry, 1917; died October 31; age 63.

Burbridge, Charles A., Grand Rapids, Mich.; Philadelphia Dental College, 1904; died November 5; age 80.

Burger, William J., Erie, Pa.; University of Pennsylvania School of Dentistry, 1900; died January 11.

Burrill, Chester L., Mankato, Minn.; Northwestern University Dental School, 1902; died December 3; age 87.

Busby, Bert B., Milwaukee; Marquette University School of Dentistry, 1924; died October 26; age 61.

Cahill, Francis M., Worcester, Mass.; Tufts College Dental School, 1919; died November 12; age 68.

Campbell, Archibald, York, Pa.; Temple University School of Dentistry, 1930; died January 21; age 56.

Canan, Edward J., St. Clair, Mo.; St. Louis University School of Dentistry, 1926; died October 3; age 64.

Carey, David E., Zanesville, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1905; died January 21; age 81.

Cassidy, Thomas F., Wethersfield, Conn.; died February 5; age 76.

Caverly, Herbert T., Bath, Maine; New York College of Dentistry, 1921; died January 13; age 63.

Chase, Owen R., Kendall, Wis.; University of Illinois College of Dentistry, 1919; died October 23; age 63.

Chenoweth, Verner H., Cincinnati; Ohio College of Dental Surgery, University of Cincinnati, 1926; died January 3; age 58.

Christopher, Dan M., Jasper, Ala.; Vanderbilt University School of Dentistry, 1925; died December 21; age 59.

Clark, Irving A., Janesville, Wis.; Marquette University School of Dentistry, 1918; died November 6; age 67.

Cleland, William, North Hollywood, Calif.; University of Michigan School of Dentistry, 1884; died January; age 96.

Coe, George L., Milford Center, Ohio; Starling-Ohio Medical College Department of Dentistry, 1911; died October 30; age 76.

Coffey, Louis M., Lincolnton, N. C.; Baltimore Medical College, Dental Department, 1900; died October 23; age 86.

Cohen, Louis H., New Orleans; Loyola University School of Dentistry, 1928; died August 1; age 60.

Cohen, Simon, New York; died February 10; age 65.

Colburn, William A., San Francisco; College of Physicians and Surgeons, School of Dentistry, 1910; died January 21; age 80.

Conran, Wilson R., Avon, Conn.; Georgetown University School of Dentistry, 1920; died December 8; age 63.

Cook, Milton J., Alma, Mich.; University of Michigan School of Dentistry, 1893; died November 15; age 91.

Cooper, Bernard H., Sherman Oaks, Calif.; Western Reserve University School of Dentistry, 1910; died December 28; age 72.

Cosgray, William J., Toledo, Ohio; Ohio Medical University College of Dentistry, 1905; died January 3; age 76.

Coulson, Wallace M., Louisville, Ky.; Louisville College of Dentistry, 1901; died October 14; age 84.

Cram, Robert W., Seattle; Boston Dental College, 1898; died February 5; age 85.

Crittenden, Benjamin V., Auburn, Ky.; Louisville College of Dentistry, 1906; died November 20; age 81.

Crutcher, Thomas M., Louisville, Ky.; University of Louisville School of Dentistry, 1897; died October 5; age 87.

Cunningham, Thomas S., Davenport, Iowa; University of Iowa College of Dentistry, 1918; died January 2; age 63.

Current, Alfred C., Gastonia, N. C.; Atlanta-Southern Dental College, 1923; died October 23; age 63.

Cushway, Bertram C., Chicago; Northwestern University Dental School, 1900; died October 12.

Daleiden, Arthur J., Lena, Wis.; Marquette University School of Dentistry, 1912; died November 9; age 69.

Darnell, George W., Clear Lake, Iowa; Northwestern University Dental School, 1898; died August 10; age 88.

Davenport, S. Ellsworth, III, New York; Harvard Dental School, 1938; died November 16; age 49.

Davis, Walter A., Keene, N. H.; Harvard Dental School, 1901; died December 14; age 82.

De Camp, Howard E., Corning, N. Y.; University of Buffalo School of Dentistry, 1924; died October 27; age 66.

De Lespinasse, Adolph F., Vancouver, Wash.; University of Denver School of Dentistry, 1904; died November 18; age 81.

Demarest, Harry M., Bayport, N. Y.; College of Dental and Oral Surgery, 1903; died November 30; age 80.

Derr, Karl P., Mechanicsburg, Pa.; University of Pittsburgh School of Dentistry, 1935; died January 24; age 48.

Devlin, Charles E., Oakland, Pa.; University of Pittsburgh School of Dentistry, 1924; died January 5; age 67.

Dickson, Floyd E., Haskell, Okla.; St. Louis University School of Dentistry, 1927; died January 21; age 55.

Farley, Guy E., Wauwatosa, Wis.; Chicago College of Dental Surgery, 1905; died May 5; age 75.

Goggin, Robert J., Ashtabula, Ohio; Western Reserve University School of Dentistry, 1918; died July 16; age 69.

Houston, James M., Purvis, Miss.; Tulane University School of Dentistry, 1925; died May 10; age 60.

Huscher, Irvin G., Hickman Mills, Mo.; Kansas City-Western Dental College, 1923; died June 23; age 60.

Lelie, Herman L., Hollywood, Calif.; Northwestern University Dental School, 1945; died April 13; age 54.

Patterson, Ira C., Chicago; died June 3; age 71.

Riley, George H., New Haven, Conn.; University of Pennsylvania School of Dentistry, 1914; died July 20; age 70.

Rosenberg, Edward, Cambridge, Mass.; Tufts College Dental School, 1917; died May 5; age 64.

Schlecht, Carl C., Woodruff, Wis.; Marquette University School of Dentistry, 1908; died July 25; age 76.

Traver, William E., Rhinebeck, N. Y.; Philadelphia Dental College, 1895; died April 1; age 89.

Wheeler, Tracy G., Des Moines, Iowa; University of Iowa College of Dentistry, 1912; died March 30; age 68.

White, Thomas, Naperville, Ill.; Northwestern University Dental School, 1914; died June 3; age 70.

Whitehill, Norman J., Ventnor, N. J.; University of Pennsylvania School of Dentistry, 1925; died May 27; age 58.

Wiener, Jack A., Wilmington, Del.; Temple University School of Dentistry, 1939; died June 10; age 44.

Wilde, George H., Milwaukee; Milwaukee Medical College Dental Department, 1899; died Feb. 9; age 88.

Will, Arthur A., St. Louis; Washington University School of Dentistry, 1911; died February 2; age 70.

Willenbrock, Berthold D., DeBary, Fla.; College of Dental and Oral Surgery, 1915; died April 13; age 80.

Williams, Fred H., Rural, Fla.; Northwestern University Dental School, 1902; died February 11; age 82.

Williams, Frederick H., Katonah, N. Y.; Philadelphia Dental College, 1898; died January 28; age 81.

Williams, George L., Millen, Ga.; Southern Dental College, 1917; died March 2; age 70.

Williams, Jacob M., Paragould, Ark.; University of Tennessee College of Dentistry, 1917; died January 26; age 66.

Williams, Louis B., Vancouver, Wash.; University of Minnesota School of Dentistry, 1908; died March 11; age 74.

Williams, Orvall J., Mt. Angel, Ore.; North Pacific College of Oregon School of Dentistry, 1937; died April 18; age 49.

Williams, William H., Niles, Ohio; Western Reserve University School of Dentistry, 1914; died March 18; age 67.

Willis, Bruce W., Cuba, Mo.; Marion-Sims Dental College, 1903; died July 16; age 82.

Wilson, Everest J., Philadelphia; University of Pennsylvania School of Dentistry, 1915; died April 13; age 66.

Wilson, Joseph C., Amsterdam, N. Y.; University of Pennsylvania School of Dentistry, 1918; died April 11; age 63.

Wilson, William F., Vernon, Texas; University of Tennessee College of Dentistry, 1932; died July 17; age 52.

Winans, Joseph F., Shelby, Ohio; Starling-Ohio Medical College Department of Dentistry, 1913; died June 1; age 70.

Winchell, Clarence G., Ionia, Mich.; Chicago College of Dental Surgery, 1903; died January 17; age 79.

Winget, William B., Richmond, Ill.; Northwestern University Dental School, 1891; died January 5; age 94.

Wisniewski, Stanley S., Wilmington, Del.; Temple University School of Dentistry, 1935; died March 11; age 50.

Wood, Seely C., LaSalle, Ill.; Chicago College of Dental Surgery, 1909; died April 25; age 72.

Wright, Alfonso F., Jr., Blacksburg, Va.; Medical College of Virginia School of Dentistry, 1949; died February 24; age 37.

Wright, Claud L., Carbondale, Ill.; St. Louis University School of Dentistry, 1929; died March 17; age 62.

Wyche, Thomas G., Durant, Okla.; Kansas City-Western Dental College, 1931; died January 25; age 57.

Wycoff, Normal N., Trinidad, Colo.; University of Denver School of Dentistry, 1902; died June 21; age 84.

Wylie, William L., Cleveland Heights, Ohio; Northwestern University Dental School, 1919; died July 29; age 74.

Yackee, Earl N., Chicago; Chicago College of Dental Surgery, 1915; died January 13; age 67.

Yankowitz, Abraham, Brooklyn; University of Buffalo School of Dentistry, 1934; died June 22; age 52.

Yessler, Arthur M., Woodstock, Ill.; Northwestern University Dental School, 1908; died February 13; age 79.

Young, Isaac H., Baltimore; Howard University College of Dentistry, 1920; died May; age 70.

Young, Ralph L., Twentynine Palms, Calif.; University of Southern California School of Dentistry, 1914; died July 26; age 70.

Younger, Bob, Amarillo, Texas; Vanderbilt University School of Dentistry, 1910; died June 9; age 75.

Youngs, Fred E., Herkimer, N. Y.; University of Buffalo School of Dentistry, 1907; died March 10; age 75.

Zanglein, Emil R., Lincoln, Ill.; Chicago College of Dental Surgery, 1902; died May 12; age 81.

Zauderer, Max S., New York; New York College of Dentistry, 1915; died February 11; age 65.

Zubrod, John O., Evansville, Ind.; Indiana Dental College, 1905; died February 5; age 83.

The following deaths occurred during 1961:

Bird, Park B., Los Angeles; University of Illinois College of Dentistry, 1923; died January 24; age 62.

Blessing, Lewis E., Hackettstown, N. J.; Temple University School of Dentistry, 1927; died January 26; age 57.

Boggess, William W., Spencer, W. Va.; Ohio College of Dental Surgery, University of Cincinnati, 1916; died January 28; age 65.

Boyd, Benjamin D., Washington, D. C.; Howard University College of Dentistry, 1907; died January 30; age 77.

Boyd, Earl J., Denver; University of Denver School of Dentistry, 1919; died January 23; age 70.

Brandeau, Charles H., Maywood, Ill.; Chicago College of Dental Surgery, 1918; died February 5; age 73.

Brooks, George C., Atlanta, Ga.; Atlanta-Southern Dental College, 1929; died January 31; age 52.

Brown, Herbert I. Q., Santa Paula, Calif.; University of Southern California School of Dentistry, 1918; died January 27; age 65.

Buchman, Robert A., Dayton, Ohio; Western Reserve University School of Dentistry, 1917; died January 29; age 64.

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One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N.J.
One-Hundred and Fifth Annual Session	November 9-12, 1964	San Francisco
One-Hundred and Sixth Annual Session	November 8-11, 1965	Las Vegas, Nev.

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 14-18	Birmingham	C. R. Crook, Professional Center, Montgomery
Alaska	July 10-12	Anchorage	W. E. Alexander, 406 G St., Anchorage
Arizona			J. F. Vaughn, 2727 N. Central Ave., Phoenix
Arkansas	Apr. 8-11	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 8-11	San Francisco	F. H. Romick, 518 Sutter St., San Francisco 2
S. California	Apr. 16-18	Los Angeles	C. D. Honig, 903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 1-4	Colorado Springs	G. H. Siersma, 903 Republic Bldg., Denver 2
Connecticut	May 16, 17	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware			W. W. Flanagan, Jr., 309 S. State, Dover
Dist. of Columbia			B. D. Mattox, 1835 Eye St., N.W., Washington 6
Florida	May 13-16	Miami Beach	L. J. Atkins, 518 Tampa St., Tampa
Georgia	Oct. 1-4	Atlanta	F. M. Butler, Jr., 307 Southern United Bldg., Macon
Hawaii			J. H. Dawe, 291 Alexander Young Bldg., Honolulu 13
Idaho	Sept. 4-6	Sun Valley	L. L. Nissen, 4th St. and Boulevard, Idaho Falls
Illinois	May 7-9	Springfield	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 20-23	Indianapolis	C. L. Howell, 1012 Hume Mansur Bldg., Indianapolis 4
Iowa	May 7-9	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines 9
Kansas	May 6-9	Topeka	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 1-4	Louisville	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	May	Baton Rouge	J. S. Bernhard, 231 Atkins Ave., Shreveport 26
Maine			S. M. Gower, 6 Coburn Ave., Skowhegan
Maryland	May 6-9	Baltimore	W. Schunick, 19 Medical Arts Bldg., Baltimore 1

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Massachusetts	Apr. 29-May 2	Boston	H. E. Tingley, 227 Commonwealth Ave., Boston
Michigan	Apr. 9-11	Grand Rapids	F. Wertheimer, Michigan Dept. of Health, Lansing
Minnesota	Apr. 2-4	St. Paul	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4W
Mississippi			M. C. O'Keefe, Medical Arts Bldg., Jackson 2
Missouri	Apr. 24	St. Louis	E. D. Suggett, Merchants Bank Bldg., Jefferson City
Montana	May 3-5	Billings	R. C. Ritter, 28 N. Black St., Bozeman
Nebraska	Apr. 30-May 2	Omaha	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada			O. M. Seifert, 821 Ryland Ave., Reno
New Hampshire			F. E. Williams, 517 Milton St., Manchester
New Jersey	May 20-23	Atlantic City	J. G. Carr, 407 Cooper St., Camden 2
New Mexico	June 6-9	Santa Fe	E. P. Purtell, 2917 Santa Cruz Ave., S.E., Albuquerque
New York	May 6-10	Lake Kiamesha	C. A. Wilkie, 268 Ashland Pl., Brooklyn 17
North Carolina	May 6-9	Pinehurst	S. B. Towler, P.O. Box 11065, Raleigh
North Dakota	Sept. 10-12	Fargo	D. R. Perry, Box 866, Bismarck
Ohio	Nov. 5-8	Columbus	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 8-11	Oklahoma City	W. C. Hopkins, 210 Plaza Court Bldg., Oklahoma City
Oregon	May 7-10	Portland	T. D. Holder, Selling Bldg., Portland
Panama C. Z.			H. L. Mertz, Jr., P.O. Box 1417, Balboa
Pennsylvania	May 21-23	Wernersville	I. Sissman, 217 State St., Harrisburg
Puerto Rico	Oct. 21-23	San Juan	R. Gonzalez R., Box 10452, Caparra Heights
Rhode Island	Jan. 14	Providence	E. Z. Radlo, 901 Union Trust Bldg., Providence
South Carolina	June 10-13	Myrtle Beach	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 13-15	Yankton	R. E. Decker, 2909 Poplar Dr., Sioux Falls
Tennessee	May 6-10	Chattanooga	J. J. Vaughn, Jr., 210 23rd Ave., N., Nashville 5
Texas	Apr. 29-May 2	Dallas	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah			R. C. Dalgleish, 1554 Princeton Ave., Salt Lake City
Vermont			E. C. Woods, 128 Merchants Row, Rutland
Virginia	Apr. 29-May 2	Richmond	M. E. Henderson, Shenandoah Bldg., Roanoke 11
Washington			R. V. Tucker, 417 Grosvenor House, 500 Wall St., Seattle 1
West Virginia	July 16-19	White Sulphur Springs	P. H. Loflin, 109 E. Main St., Beckley
Wisconsin	Apr. 30-May 2	Milwaukee	C. J. Baumann, Jr., 704 W. Wisconsin Ave., Milwaukee
Wyoming			T. J. Drew, State Office Bldg., Cheyenne

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Dist. of Columbia			J. A. Madden, 1740 Massachusetts Ave., N.W., Washington 11
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North Carolina			J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota			F. A. Maides, First National Bank Bldg., Grand Forks
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Oklahoma			W. H. Stephens, Plaza Court Bldg., Oklahoma City
Oregon			C. Wheeler, Medical Arts Bldg., Portland
Pennsylvania	Dec. 6, 7* Dec. 6†	Philadelphia Philadelphia	P. Swanson, 8111 Jenkins Arcade, Pittsburgh
Puerto Rico			J. Mercado C., Comercio St., #452, San Juan
Rhode Island			A. E. Turcone, 298 Broadway, Providence
South Carolina			W. J. Brockington, 2827 Millwood Ave., Columbia 1
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American Board of Oral Pathology	Dec. 9, 10		W. G. Shafer, Indiana University, School of Dentistry, 1121 W. Michigan St., Indianapolis 2
American Board of Oral Surgery	Dec. 4 Mar. 24-27	Chicago Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 23-28	Los Angeles	A. W. Moore, University of Washington, School of Dentistry, Seattle 5
American Board of Pedodontics	Oct. 30-Nov. 2	Ann Arbor, Mich.	R. L. Ireland, College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Board of Peridontology			B. O. A. Thomas, 668 Homer Ave., Palo Alto, Calif.
American Board of Prosthodontics	Aug. 14-19	Chicago	C. H. Jamieson, David Whitney Bldg., Detroit 26
Council on Dental Education, Dental Aptitude Tests	Oct. 6, 7 Jan. 5, 6 Apr. 27, 28		Secretary, 222 E. Superior St., Chicago 11
National Board of Dental Examiners	Dec. 4, 5		Grace Parkin, 222 East Superior St., Chicago 11

MEETINGS OF OTHER ORGANIZATIONS

Name	*Date*	*Place*	*Secretary or Chairman and Address*
American Academy of Gold Foil Operators	Oct. 11-13	Philadelphia	C. C. Latham, P.O. Box 266, Coronado, Calif.
American Academy of the History of Dentistry	Oct. 13	Philadelphia	M. B. Asbell, 25 Haddon Ave., Camden, N.J.
American Academy of Implant Dentures	Oct. 12-15	Philadelphia	A. N. Cranin, 2120 Ocean Ave., Brooklyn 29
American Academy of Maxillofacial Prosthetics	Oct. 11-13	Philadelphia	M. C. Cleaver, 2330 Linwood Ave., Coytesville, Fort Lee, N.J.
American Academy of Oral Roentgenology	Oct. 14, 15	Philadelphia	T. S. Grant, University of California Medical Center, San Francisco 22
American Academy of Periodontology	Oct. 20-25	Bermuda Cruise	C. E. Chamberlain, 1101 N. North St., Peoria, Ill.
American Association of Dental Editors	Oct. 14	Philadelphia	E. M. Ebert, 10058 Ewing Ave., Chicago
American Association of Dental Examiners	Oct. 13, 14	Philadelphia	C. J. Schweikhardt, 20 Durand Rd., Maplewood, N.J.
American Association of Public Health Dentists	Oct. 14	Philadelphia	A. H. Trithart, Montana State Board of Health, Helena
American College of Dentists	Oct. 14, 15	Philadelphia	O. W. Brandhorst, 4236 Lindell Blvd., St. Louis
American Dental Assistants Association	Oct. 16-19	Philadelphia	Mrs. E. Troutman, First National Bank Bldg., La Porte, Ind.
American Dental Hygienists' Association	Oct. 16-19	Philadelphia	M. E. Swanson, 100 E. Ohio St., Chicago 11
American Dental Society of Anesthesiology	Oct. 13-15	New York	H. A. Sultz, 1275 Delaware Ave., Buffalo 9

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Name	*Date*	*Place*	*Secretary or Chairman and Address*
American Denture Society	Oct. 13, 14	Philadelphia	V. L. Steffel, 19 W. Fifth Ave., Columbus, Ohio
American Institute of Oral Biology	Nov. 6-10	Palm Springs, Calif.	M. L. Meyer, 2240 Channing Way, Berkeley 4, Calif.
American Public Health Association, Dental Health Section	Nov. 13-17	Detroit	D. F. Striffler, New Mexico Dept. of Public Health, 408 Galisteo St., Santa Fe
American Society for the Advancement of General Anesthesia in Dentistry	Oct. 23	New York	M. H. Feldman, 730 Fifth Ave., New York 19
American Society of Dentistry for Children	Oct. 13-15	Philadelphia	W. O. Young, 120 N. Capitol Blvd., Boise, Idaho
American Society of Oral Surgeons	Oct. 7-13	Bermuda Cruise	D. C. Trexler, 840 N. Lake Shore Dr., Chicago 11
Ark-La-Tex Dental Congress	Aug. 21	Shreveport, La.	G. Poulos, State National Bank Bldg., Texarkana, Ark.
Armed Forces Dental Officers Association	Oct. 15, 16	Philadelphia	W. Z. Kling, Medical Arts Bldg., San Antonio, Texas
Asian-Pacific Dental Conference (Third)	Oct. 17-22	Tokyo, Japan	H. Kawamura, Japan Dental Association, 4 Chome Kudan, Chiyodaku, Tokyo, Japan
Association of American Women Dentists	Oct. 16	Philadelphia	J. Palancia, 1527 W. Passyunk Ave., Philadelphia
Australian Dental Congress (Sixteenth)	Aug. 14-18	Sydney, N.S.W.	D. Freeman, 185 Elizabeth St., Sydney, New South Wales
Austrian Dental Society, Centennial Jubilee Congress	Nov. 14-18	Vienna	S. Loos, Weihburggasse 10-12, Vienna I, Austria
Chicago Dental Society	Feb. 18-21	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago
Congrès de L'Entente Odontologique	Nov. 20-26	Versailles, France	J. L. Dephilippe, 39 Blvd. Malesherbes, Paris France
Czechoslovak Stomatologists, (Second Congress)	Sept. 12-15	Mariánské (Marienbad)	F. Urban, 2é Stomatologicka Kliniká, Karlova nám. 32, Praga 2, Czechoslovakia
European Organization for Research on Fluorine and Dental Caries Prevention (ORCA)	July 5-8	London, England	H. R. Held, 18 Passage du Teraillet, Geneva, Switzerland
European Orthodontic Society, (37th Congress)	Sept. 7-11	Bologna, Italy	Secretary of the Congress, via Marsili 15, Bologna, Italy
Fauchard Bicentenary	July 1, 2	Paris, France	M. Filderman, 67 rue de Tocqueville, Paris, France
Fàdèration Dentaire Internationale, (49th Annual Session)	July 9-15	Helsinki, Finland	G. H. Leatherman, 35 Devonshire Pl., London W.1, England U.S.A. Section, O. H. Moen, 6 Main St., Watertown, Wis.
French Congress of Stomatology (Seventeenth)	Oct. 23-28	Paris	Secrétariat, 17th Congrès Francais de Stomatologie 20 passage Dauphine, Paris 6e, France
German Society for Dentistry, (89th Annual Meeting)	Oct. 13-15	Mainz	M. Hermann, Schlesische Strasse 18, Mainz, Germany
Greater New York Dental Meeting (Thirty-seventh)	Dec. 4-8	New York	Mrs. M. Purdy, 106-A Hotel Statler Hilton, New York 1
International Association of Dental Students	Aug. 21-27	London, England	D. H. Clark, Royal Dental Hospital, Leicester Sq., London W.C.2, England
International Dental Congress of Uruguay-Argentina	Nov. 12-19	Montevideo, Uruguay	J. C. Turell, Av. Agraciada 1464 (P. 13), Montevideo, Uruguay
International College of Dentists	Oct. 14, 15	Philadelphia	H. O. Westerdahl, 4829 Minnetonka Blvd., Minneapolis 16
Italian Medical Dental Association, (35th Congress)	Dec. 8-12	Milan	P. Lalli, Via Bonifacio VIII, 22, Rome, Italy
Mexican Dental Association (Sixth biennial)	Nov. 19-23	Mexico City	C. J. Cornish, Sinaloa No. 9, Mexico 7, D.F.
Mid-Continent Dental Congress	Oct. 29-Nov. 1	St. Louis	J. E. Brophy, 8013 Maryland Ave., St. Louis 5

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Name	*Date*	*Place*	*Secretary or Chairman and Address*
National Association of Seventh-Day Adventist Dentists	Oct. 12-14	Philadelphia	E. M. Collins, College of Medical Evangelists, School of Dentistry, Loma Linda, Calif.
National Dental Association	Aug. 6-10	Washington, D.C.	E. N. Jackson, P.O. Box 197, Charlottesville, Va.
New England Dental Society	Nov. 1, 2	Boston	W. F. O'Meara, 904 Main St., Hartford, Conn.
New Orleans Dental Conference	Nov. 5-8	New Orleans	J. R. Bond, Maison Blanche Bldg., New Orleans
Northeastern Society of Orthodontists	Oct. 29-31	Rochester, N.Y.	D. Mossberg, 36 Central Park S., New York 19
Northeastern Society of Periodontists	Nov. 3	New York	I. W. Scopp, V.A. Hospital, First Ave. at E. 24th St., New York 10
Odontological Society of Western Pennsylvania	Oct. 31-Nov. 1	Pittsburgh	H. D. Butts, Jr., Jenkins Bldg., Pittsburgh 22
Peru National Dental Congress (Fifth) and First International Congress of Stomatology	Nov. 5-11	Lima	G. Roose C., Av. Pershing 155, San Isidro, Lima, Peru
Women's Auxiliary to the American Dental Association	Oct. 16-19	Philadelphia	Mrs. G. G. Smith, 212 S. Third St., Kaysville, Utah

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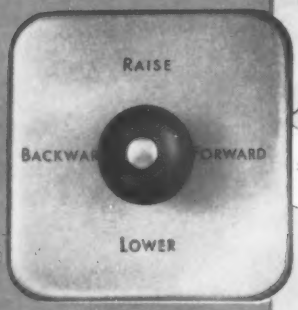

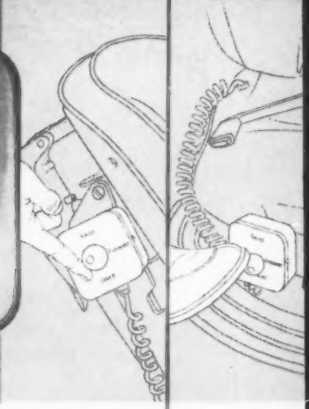

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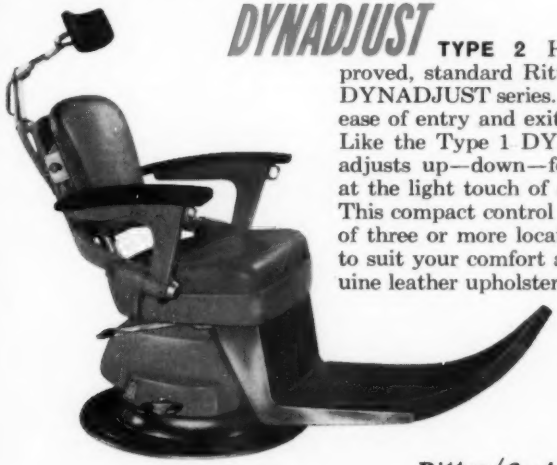

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CALIFORNIA—San Lorenzo-Bay area — For lease. Modern, one story, air conditioned, 5-unit medical-dental-pharmacy building. Located in excellent growth area 15 minutes south of Oakland off freeway. Proposed completion date June 1962. Exceptional opportunity for orthodontist and pedodontist. None in area as yet. On main heavily traveled boulevard near schools. Contact now while in planning stage and take advantage of being able to work with architect in planning your own layout. Option to buy into building to be offered at a later date. Call BRowning 6-2404 or ELgin 7-7967 or write Dr. P. Oppenheim, 288 Lewelling Blvd., San Lorenzo, Calif.

•

CALIFORNIA—Southern. For sale. Modern, fully equipped two-chair office and practice. Located in small medical building in fast growing, smog-free area. Additional operatories plumbed. Little cash needed. Personal, family reasons force sale. Address A.D.A. Box No. 297.

•

CALIFORNIA—San Diego. For sale. Oral surgery practice. Fully equipped. Established in 1946. Three recovery rooms, two operating rooms, one large surgery, two reception rooms, nurse's office and large private office. Several months rent free to qualified man. Illness forces sale. Contact Dr. Jack Armstrong, 3005 4th Ave., San Diego 3.

CALIFORNIA—Highland Professional Center of Los Angeles has one suite left. Three operatories have northern exposure into a beautiful garden. Suite is air conditioned, has hi fi music and ample parking space. Exceptional opportunity for orthodontist—none in area. Contact Mr. Almskog, 5823 York Blvd., Los Angeles 42, Calif.

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FLORIDA—Southeast coast area. For rent. New attractive office set up for three-chair operation. Monthly rent $181.33, including air conditioning and utilities. First year's gross over $19,000. Will turn over patients. Leaving area. Address A.D.A. Box No. 377.

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FLORIDA—Suburban Miami. For sale. Two-chair office. Very modern equipment. Airotor, central air conditioning, etc. Active practice grossing over $35,000 with short hours. Price $6,000 which is half appraised value. Address A.D.A. Box No. 346.

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GEORGIA—Atlanta. For sale. Two-chair active dental practice and equipment. Fully air conditioned. Neighborhood type of practice. Low overhead. Moderately priced. Address A.D.A. Box No. 378.

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ILLINOIS—CHICAGO. For rent. Six room suite suitable for oral surgery or general practice of dentistry. Completely modern. Fully air conditioned. No equipment. Located on 5th floor of Chicago Eye, Ear, Nose & Throat Hospital. For further information call FRanklin 2-9400 or write Mr. Robert Collins, 231 W. Washington St., Chicago 26.

ILLINOIS—For rent. Office on second floor of State Bank Building. Equipment available if desired. Rent $50 per month including water and heat. Present dentist leaving for family reasons. Good prospects for expanding practice. For further particulars write State Bank of Nauvoo, Nauvoo, Ill.

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ILLINOIS—Collinsville. For sale. Owing to the death of Dr. E. P. Gilbert, his son offers for sale his well established practice carried on for over 30 years at 124 W. Main St. Office space consists of operating room, laboratory and waiting room with additional space if desired. Long term lease at reasonable rental. Fully equipped. Address Col. O. E. Gilbert, Hqs. 327th Fighter Group, Truax Field, Wis.

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INDIANA—Available. New office space suitable for pedodontist. Two general practitioners (physicians), general surgeon, radiologist and dentist occupy building. Non-group. Write or call William Wise, M.D., 2369 N. Goodlet, Indianapolis. Phone Melrose 8-4528.

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INDIANA—For sale. Completely equipped two-chair dental office attached to seven room house. Everything—equipment, house and part of house furnishings—$10,000. Small western Indiana county seat town. No other dentist. Address A.D.A. Box No. 255.

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IOWA—East central. For sale. Active practice. Two operatories. Up to date equipment. Terms to suit. Will retire when you are ready to take over. Address A.D.A. Box No. 379.

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MAINE—Portland. Available now. Professional office space located in busy shopping center. Two physicians now occupying space. Growing area. Largest shopping center in Maine. Address Wm. E. Wyatt, D.O., Cumberland Center, Maine.

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MAINE—Rockland. For sale. Modern dental office and general practice of prominent deceased dentist. City of 10,000. County seat. Wonderful opportunity. Write Mrs. Aina Howard, Owls Head, Maine.

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NEBRASKA—Attention returning servicemen and June graduates. Exceptional practice now available. Grossing $45,000. Located in the heart of the irrigated farming district and new oil boom area. New Eastern industry begins plant operation this month. No Blue Sky. Equipment inventory less depreciation is sale price. Owner returning to school. This practice is sacrifice. Address A.D.A. Box No. 380.

NEW JERSEY—For sale. Custom built home-office in fastest growing Bergen County town. Beautiful wooded plot with stocked trout stream on property. Address A.D.A. Box No. 381.

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NEW JERSEY—For sale. Beautiful home-office combination and practice established 40 years. Working 24 hour week earning over $25,000. Easily doubled. Or will sell practice only. No money needed. Must be capable. Address A.D.A. Box No. 382.

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NEW JERSEY—Dental office available, fully air conditioned. South Jersey community, 35 miles from Philadelphia and the same distance from Atlantic City. Ideal location, city of 38,000, dentist needed. Address A.D.A. Box No. 354.

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NEW JERSEY—Glen Rock. For sale. Practice, home-office combination, equipment and furniture. Contact Dr. Harold L. White, 281 Rock Rd., Glen Rock, N. J., or phone GIlbert 4-3478.

•

NEW JERSEY—For sale. Home-office combination located in picturesque Hunterdon County. Enjoy virtual dental monopoly. Excellent opportunity for industrious practitioner. Owner leaving to specialize. Address A.D.A. Box No. 301.

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NEW YORK—Bay Ridge-Brooklyn. Opportunity to rent dental suite in medical center occupied by large group of established physicians. Call Mrs. Fennell, BEachview 8-3300 Monday through Friday.

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OHIO—For sale. General dentistry practice. Grossing over $2,000 per month. Equipped with two-chair S. S. White master units with Borden Airotors. Located in small northern Ohio college town close to city. Address A.D.A. Box No. 383.

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OREGON—Southern. For sale. Active practice and modern equipment for two operatories. Airotor and Dental-Ez chair. Grossing $30,000-$40,000 per year. Beautiful three bedroom home also available. Town of 10,000 with drawing area of 40,000, county seat. Owner recalled to service. Address A.D.A. Box No. 384.

OREGON—For sale. Modern, air conditioned, ground floor dental office. Two operating rooms, reception room, business office, laboratory and dark room. Fast growing community 28 miles from Portland. Reasonable price. Terms. Reason for selling—arthritis. Address A.D.A. Box No. 358.

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PENNSYLVANIA—For sale. Dental bungalow office with two fully equipped operatories. Also attached rental unit. Beautifully scrubbed, corner location, progressive, rapidly growing area. Terms can be arranged. Leaving to specialize. Address A.D.A. Box No. 385.

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PENNSYLVANIA—Sykesville. For rent. Dental office. No equipment. Used for dental office since 1949. Ill health forced retirement of former dentist. Only dental office in town. Located on good road (route 119 Pittsburgh to Buffalo). Four churches, high school and bank. Apartment available, if desired. For further information contact Arthur P. Sandy, 206 E. Main St., Sykesville, Pa., or phone (business) 894-7883 (home) 894-5252.

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SOUTH DAKOTA—For sale. Excellent dental practice netting $18,000 per year for past three years. Two-chair bungalow office with room for third. Located near hospital in good sized, progressive town. Option to buy any or all equipment. Full mouth surveys on all patients. Good fees. High percentage of crown and bridge and full mouth reconstruction. Address A.D.A. Box No. 309.

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TEXAS—Available. Office space in small medical-dental building in Amarillo. Located in a very good, rapidly growing neighborhood. Excellent location for a dentist seeking to establish a practice. Ample parking, near shopping. Contact Morris Loewenstern, M.D., P.O. Box 9009, Amarillo.

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WISCONSIN—Available. Well established dental practice specializing in complete mouth dentistry. Ultra modern efficiency office. Available with all or part of equipment. Located north side of Milwaukee. Address A.D.A. Box No. 386.

OPPORTUNITIES AVAILABLE

CALIFORNIA—Northern. Excellent opportunity for dentist, preferably age 45 to 65, wishing 4½ day week without investment or patient source worry. Position is primarily diagnosing. Commission basis with $10,000 minimum. Would consider dentist with handicap preventing practice of operative dentistry. Send résumé to A.D.A. Box No. 387.

CALIFORNIA—San Francisco peninsula area. Wanted. General practitioner or pedodontist for group practice. Under 40 years, military obligation completed. Address A.D.A. Box No. 388.

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CALIFORNIA—San Diego. Wanted. Associate or partner to buy into and take over practice. A.D.A. Box No. 389.

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FLORIDA—Associate wanted. New practice, modern office, good fees. Lovely Florida community. Address A.D.A. Box No. 359.

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ILLINOIS—Excellent opportunity for a dentist in an expanding community. Address A.D.A. Box No. 390.

•

ILLINOIS—Community of 3,600 in central Illinois desires dentist. Suite of three air conditioned rooms available. Ground floor. Formerly occupied by dentist. Address A.D.A. Box No. 391.

•

MAINE—Central. Associate wanted for active, Ritter equipped, two-chair practice grossing $30,000 in area of 40,000 population. Eventual purchase. Will stay one year to introduce then leave state to specialize. Address A.D.A. Box No. 392.

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NEW MEXICO—Grants. Population and trading area of 30,000 needs dentists. Office facilities available. Will help set up practice or hire. Address G. R. Gutierrez, M.D., 1010 Roosevelt Blvd., Grants, N. M.

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NORTH DAKOTA—Streeter. Very good opportunity for dentist. Nearest dentist 16 miles. No other dentist closer than 28 miles. Contact Gerhart Dewald, Sec., Streeter Lions Club, Streeter, N. D.

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SOUTH DAKOTA—Young dentist wanted in small community in eastern South Dakota. Will finance office and home on special, liberal terms. Good fishing close by. For further information address A.D.A. Box No. 414.

HYGIENISTS

ILLINOIS—Northwestern. Hygienist wanted for well established dental practice (10 years). Air conditioned office. Five day week. Salary and commission. Three hours from Chicago. Write A.D.A. Box No. 393.

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INDIANA—Northern. Wanted. Full time hygienist, $125-$175 per week. Town of 10,000 population. Write A.D.A. Box No. 394.

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NEW YORK—Dental hygienists wanted. Salary $4,250-$5,250 per year plus longevity increments. Annual salary increases. Less maintenance (board, room and laundry $9.79 per week). Five day, eight hour work week. Annual vacation with pay. Paid sick leave. Life, accident and health insurance and social security available. For information write Director, Wassaic State School, Wassaic, N. Y.

PENNSYLVANIA—Public health dental hygienist II needed by Pennsylvania State Health Department. Starting salary $4,773. Requires completion of a two year course in dental hygiene and two years' experience; equivalent combination of experience and training will be considered. Also requires license or eligibility for licensure, to practice as a dental hygienist as issued by the Pennsylvania State Dental Council and Examining Board. Position under Merit System; real opportunity for professional training and advancement, excellent retirement system, liberal sick leave, vacation and holiday benefits. For further information or applications, please contact C. Earl Albrecht, M.D., Deputy Secretary of Health, P.O. Box 90, Harrisburg, Pa.

OPPORTUNITIES WANTED

California licensed dentist, 27, completing military obligation October 1961, desires association with group or private practitioner in the southern California area. Address A.D.A. Box No. 395.

•

Florida licensed dentist age 33, married, family, 1956 Pittsburgh graduate, desires association, purchase or office space in southern Florida. Completed A.D.A. approved rotating internship and military obligation. Address A.D.A. Box No. 396.

ILLINOIS—Dentist, military obligation completed, desires location in rural or suburban community in northern Illinois. Progressive area desired. Address A.D.A. Box No. 397.

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Illinois licensed dentist age 28, completing service commitment September 1961, seeks association or partnership in Chicago area. Extensive experience in crown and bridge dentistry and oral surgery. Address A.D.A. Box No. 398.

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Mail to: Bureau of Membership Records, American Dental Association, 222 East Superior Street, Chicago 11, Illinois.

KENTUCKY—Louisville graduate, age 30, desires association with established dentist in Louisville or vicinity. Address A.D.A. Box No. 399.

•

Massachusetts licensed dentist, age 27, Tufts University graduate, completing military obligation August 1961, family, desires part time association. Will accept evenings and/or weekends. Adress A.D.A. Box No. 400.

•

Minnesota licensed dentist, age 26, family. Minnesota graduate, completing military obligation August 1961, desires association, purchase or office space in suburban or metropolitan Twin Cities area. Address A.D.A. Box No. 401.

•

Periodontist, Board certified 1958, age 37, military service completed June 1961, desires association or group practice. Licensed in New York, Rhode Island and Massachusetts. Excellent references. Address A.D.A. Box No. 402.

•

Dentist, New York and New Jersey licensed, 1958 N.Y.U. graduate, desires association. Married, age 27, three years' military service completed. Have general experience. Available immediately. Address A.D.A. Box No. 403.

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New York-New Jersey licensed dentist, married, military obligation completed, desires general practice association leading to purchase. Seller must stay at least six months. Home-office considered. Address A.D.A. Box No. 404.

•

New York licensed dentist completing military obligation September 1961 and will then take part time university course in orthodontics, desires association within commuting distance from New York City. Address A.D.A. Box No. 405.

•

Oral surgeon completing third year A.D.A. approved training desires association with or purchase of established oral surgery practice. Licensed in California and Illinois. Address A.D.A. Box No. 406.

Dentist, age 46, married, desires position in industry, institution, public health or other salaried position. General practice experience and five years' experience as instructor in dental school. Address A.D.A. Box No. 407.

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National Board licensed 1956 graduate with five years' general practice experience, veteran, single, age 34, desires position in industry, public health or school, either in the United States or abroad. Address A.D.A. Box No. 408.

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Dentist with five years' successful private practice experience desires challenging position in industry, research or administration. Age 31, married, three children. Experienced in all phases of dental practice. Address A.D.A. Box No. 409.

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Dentist, age 36, married, three children, ten years' successful private practice, now desires change to position with industry, institution, public health, research, etc. Foreign or domestic. Address A.D.A. Box No. 410.

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Jeweler student wishes to buy used complete equipment and supplies for casting rings the lost wax method. Casting machine and furnace most important. Address A.D.A. Box No. 411.

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MISSOURI—For sale. Page-Chayes handpiece, necessary belts, double arm, Hanna thermospray. Giant water container, ball bearing pulleys and Giant 3½" pulley. All in perfect working condition. Reasonable. Best offer. Address A.D.A. Box No. 413.

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MONTANA—For sale. Two Ritter G-1 dental units, excellent condition, coral and green. Also two Castle Panovision lights, black. Contact Dr. G. Dachs, 795 Sunset Blvd., Kalispell, Mont.

•

NEW JERSEY—For sale. Biscayne blue Ritter Century chair, four months old, $1,050. Midwest Air Drive, 2 handpieces, four months old, $485.00. Address A.D.A. Box No. 412.

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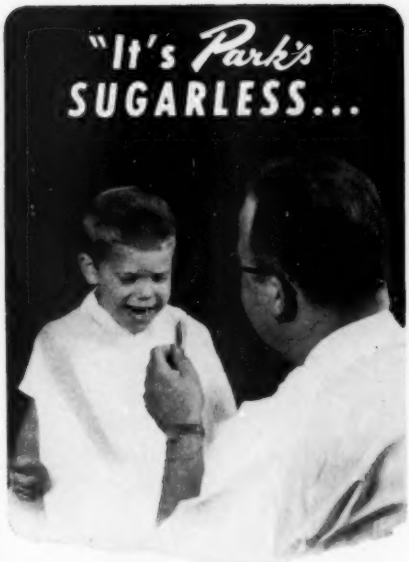

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Ordering at this time will insure early delivery of your Holiday Greeting-Calendars. Note the following improvements:

- **Two 4-color dental health education pages at back of booklet**
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Important: As a special incentive for early orders to help us in our planning, ***there will be no charge for imprinting on orders received on or before August 1, 1961.*** Otherwise imprint prices are as follows: 100-249, $1.50 per order; 250-499, $2.50; 500-1,000, $4.00; over 1,000, $4.50.

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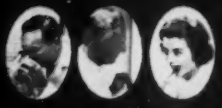

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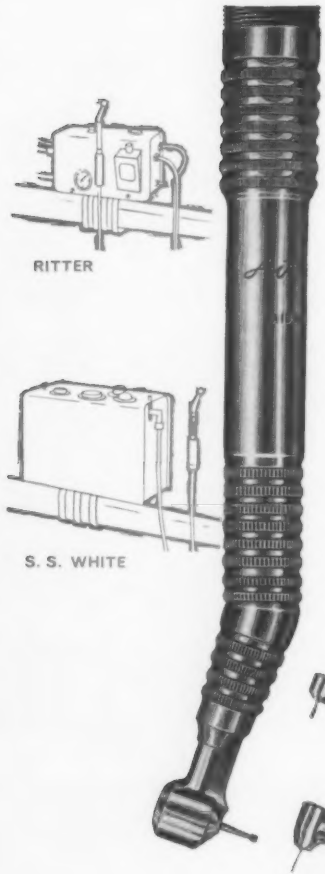

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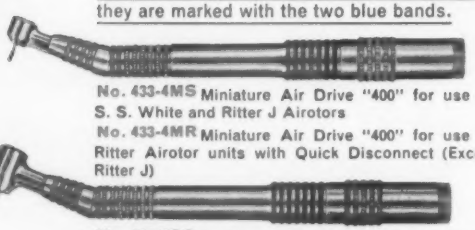
Furnished with Miniature and Standard Air Drive "400" contra angles. This new adaptor is furnished without additional charge and simply screws on to existing hoses. No need to change contra angle tubing or re-adjust oiling systems. Two blue color bands on sheath distinguish this special contra angle from other Midwest contra angles . . . IMPORTANT: do not use Midwest contra angles on Airotor units unless they are marked with the two blue bands.



No. 433-4MS Miniature Air Drive "400" for use on S. S. White and Ritter J Airotors

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PERMANENT CONVERSION ADAPTOR FOR ALL MAJOR AIR TURBINE UNITS

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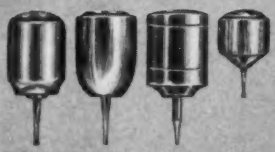

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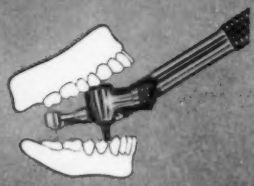

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MINIATURE CARBIDE BURS

½	33½	57	170
2	35	557	171
4	37	558	701

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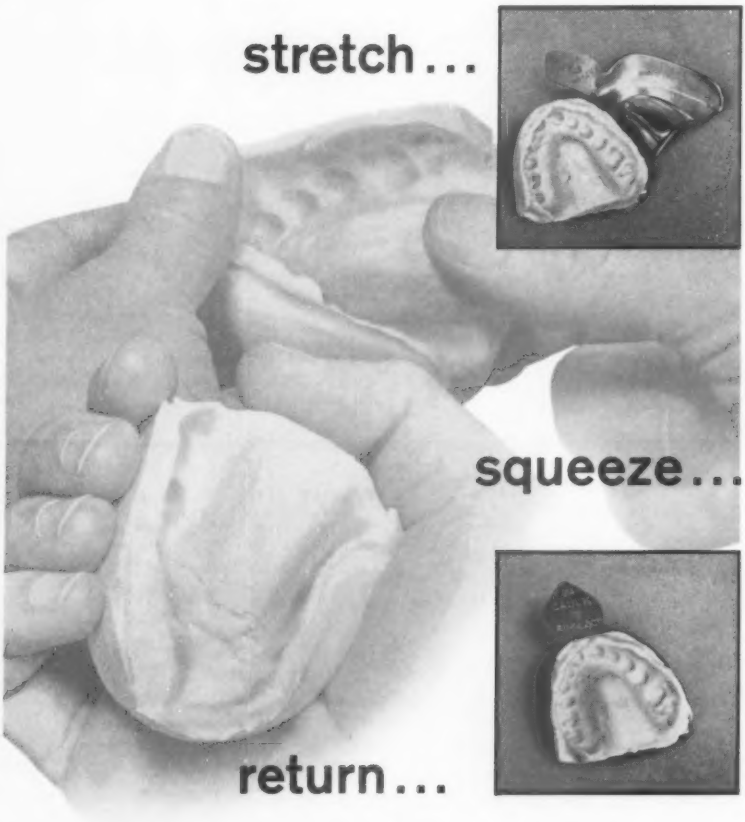

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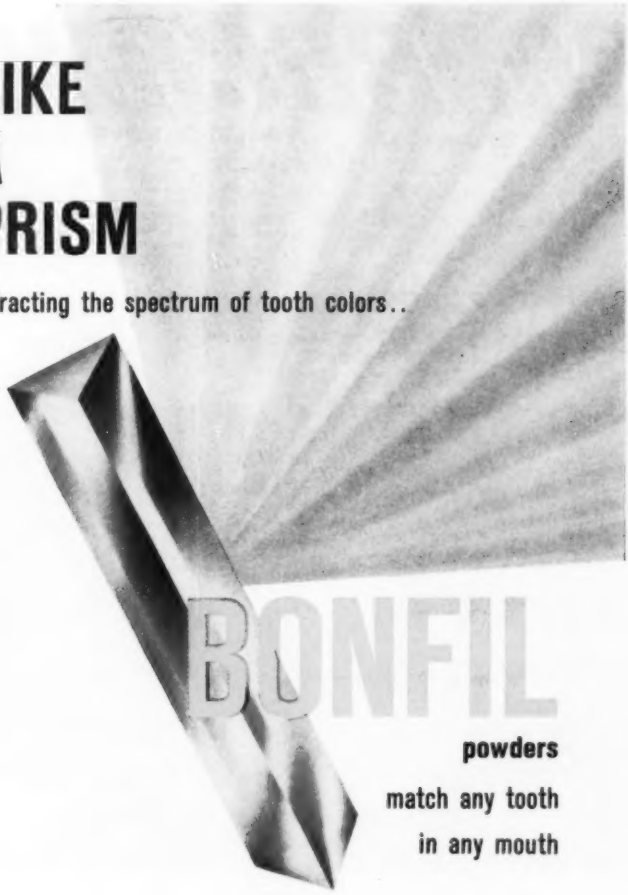

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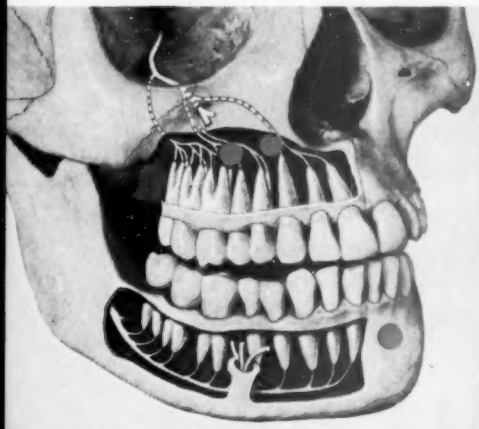

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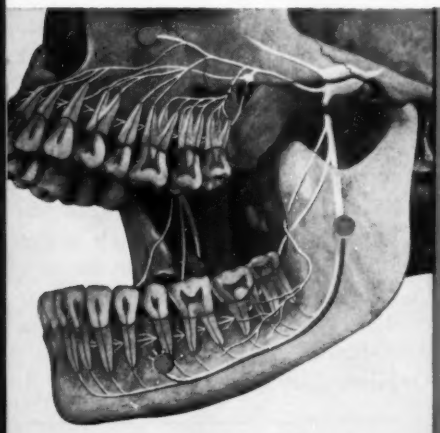

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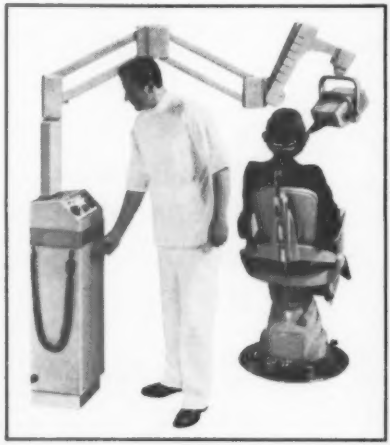

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St. Louis University
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Washington University
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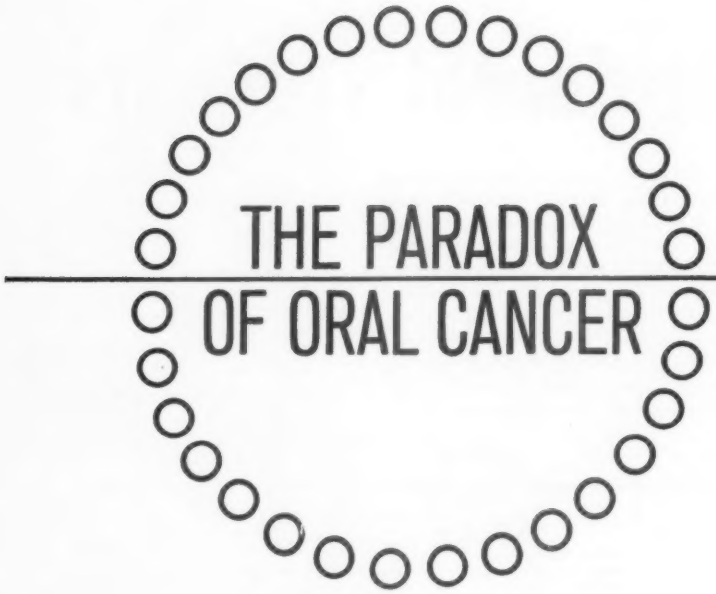

In 1961, some 13,300 cases of oral cancer will be diagnosed. Of these, only 5,000 will be cured! It is a tragic paradox that the cure rate should be so low for a cancer that is accessible and comparatively easy to detect in its early and curable stages.

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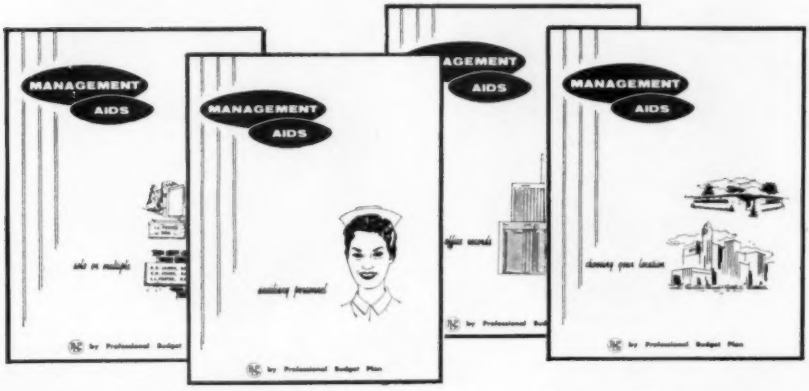

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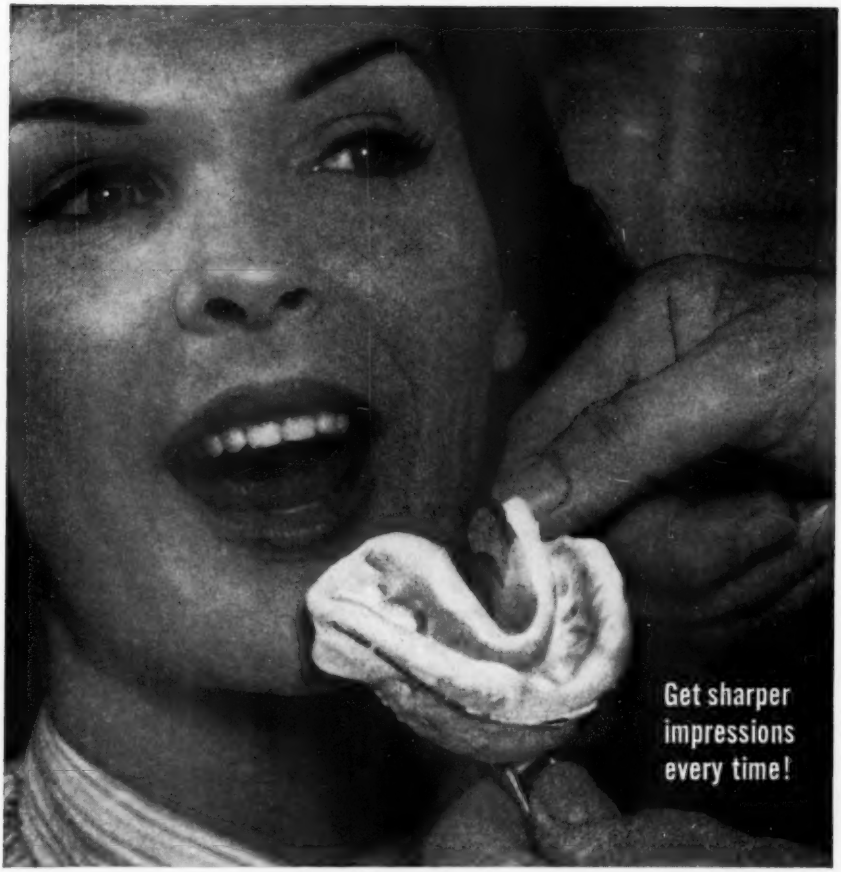

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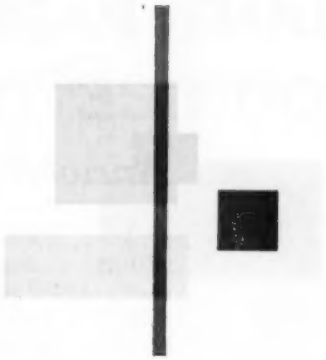

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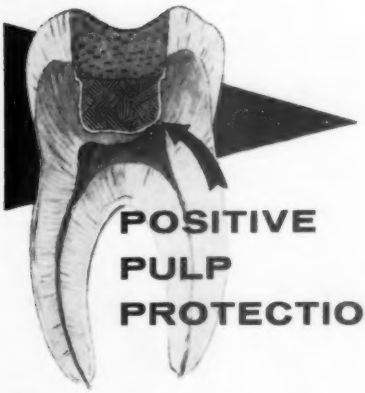

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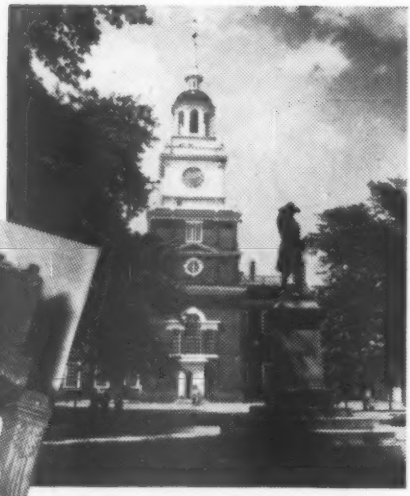

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Radiographically, the residual cyst simulates the follicular cyst. Hence, conclusive diagnosis is often dependent upon historical data and histologic findings in addition to use of radiographs of various types.

Figure 1: An extraoral view of a mandibular residual cyst. Note the cystic features of roundness, homogeneous radiolucency, distinctive periphery and hyperostotic border.

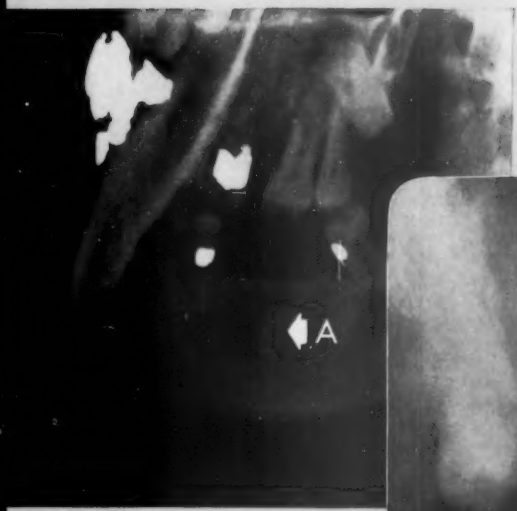

Figure 2: Occasionally the hyoid bone (A) is superimposed over a residual cyst in the body of the mandible. The remaining bicuspid is vital and normal.

Figure 3: An occlusal radiograph of a maxillary residual cyst. Note its classical cystic features and particularly its impressive expansion.

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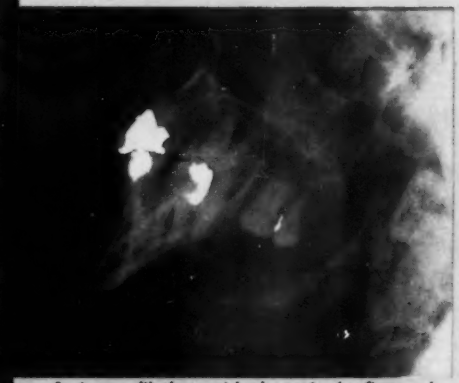
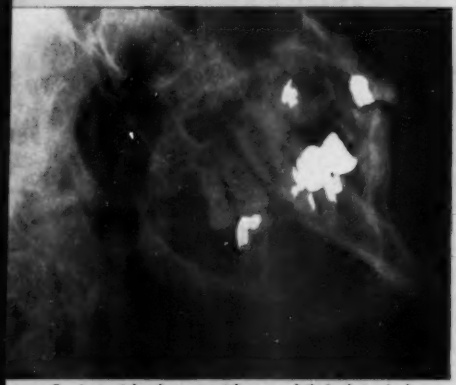
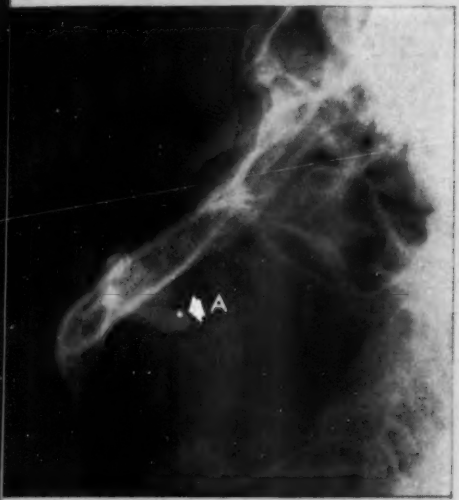


ure 4: A mandibular residual cyst in the first molar ion which appears to have originated from the ond bicuspid yet the latter is normal.



gure 5: A residual cyst with a multilobulated shape . an appearance suggestive of a multilocular cyst; ighboring teeth were not involved.



gure 6: An unusually large, severely distended resid- al cyst of the mandible causing marked anatomical eformity; note the disturbed position of the cuspid oth (A) caused by cystic pressure.

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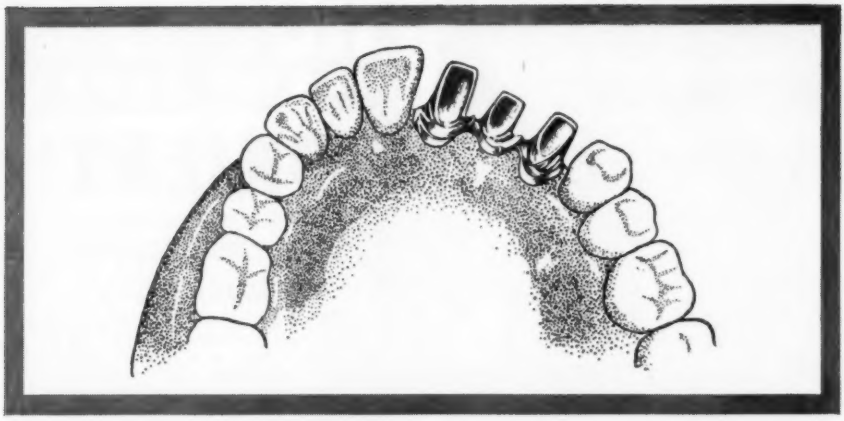

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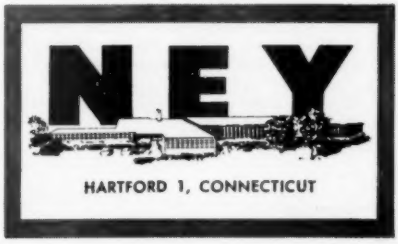

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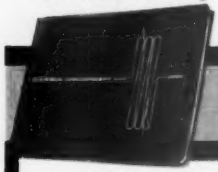

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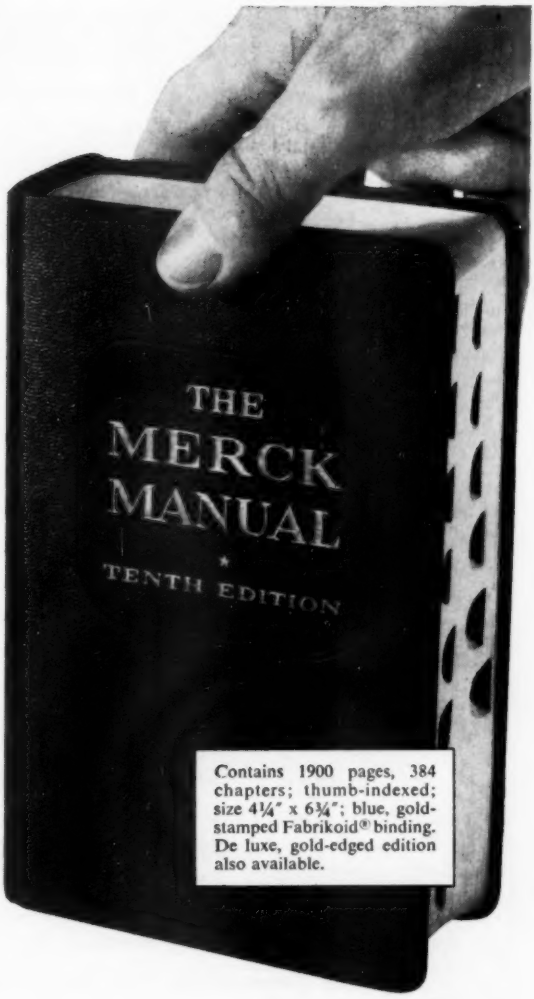

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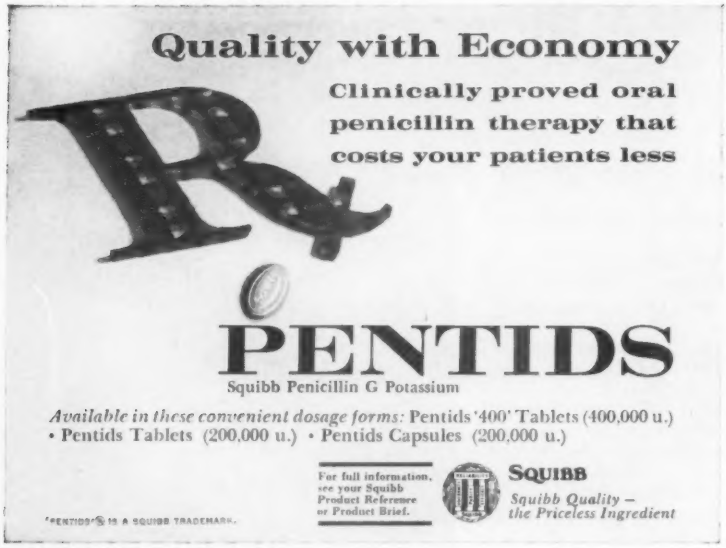
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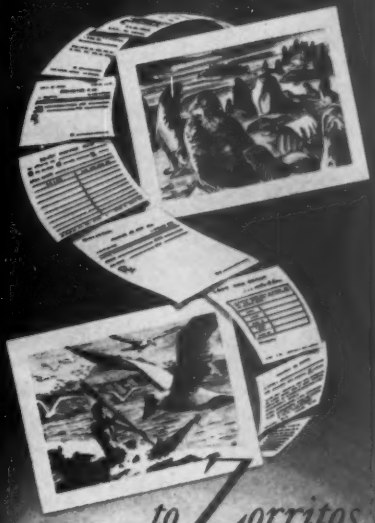

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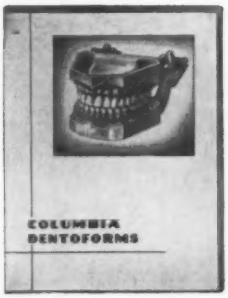

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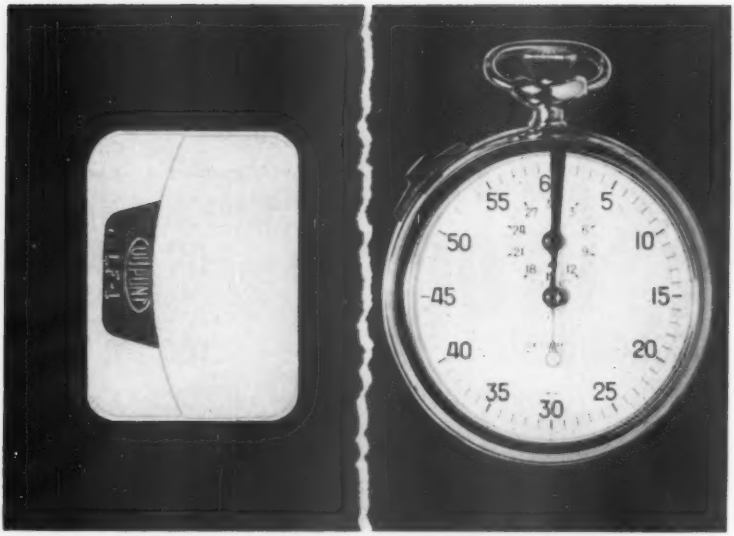

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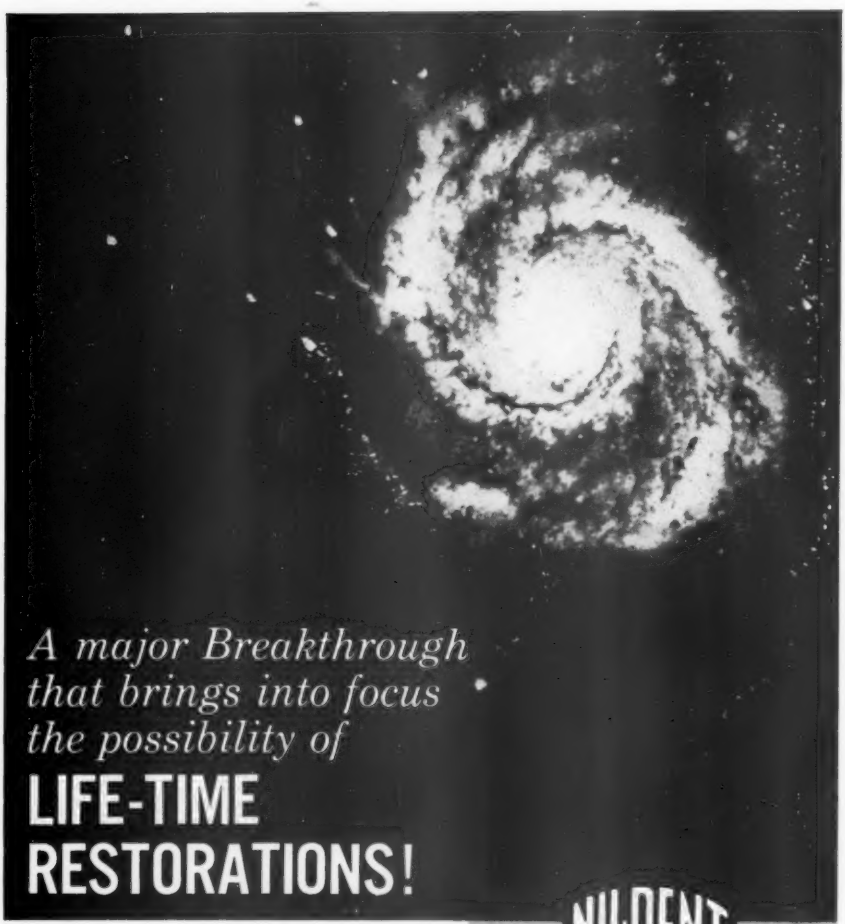

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